
UForge AppCenter User Documentation

Release 3.6

FUJITSU

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Note: There are multiple options for reading this documentation - click on the link at the lower left hand corner for these options.

Contents:

Signing In to UForge Portal

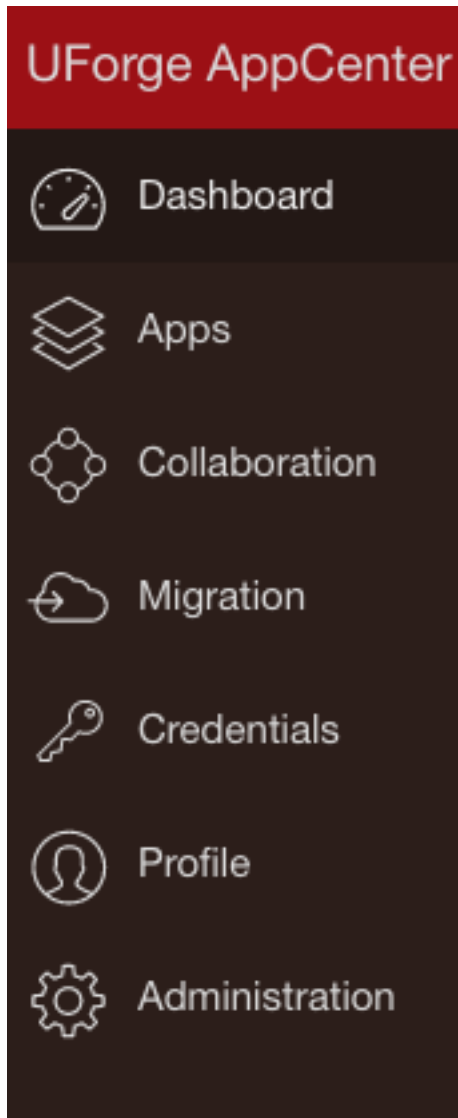
To sign in, go to the UForge Portal sign in page:

<https://your-uforge-server-hostname/uforge/>

The UForge Portal has the following pages, accessible from the left-hand sidebar:

- **Dashboard:** It shows statistics on your UForge usage.
- **Apps:** This is where your appliances are created and listed. You also go to this page to add custom software, update packages in appliances, and create images, among other things.
- **Collaboration:** This is a private area where you can share appliances with other users who are part of your workspace. These users must be invited and join your workspace. They can be part of your organization or part or another organization.
- **Migration:** This is where you can launch a scan of a live system, view the results, or compare scans.
- **Credentials:** This is where you manage your cloud account information, SSH keys and API keys.
- **Profile:** This is your UForge account information.
- **Administration:** (only for administrators of platform). Provides administration tasks including operating system and formats management.

Warning: Depending upon your access rights one or more of these tabs may not be visible.



Supported Browsers for UI Access

The following browser versions are officially supported when using the user interface:

- Firefox v35 or later
- Chrome v29 or later
- Safari v9 or later
- Internet Explorer 11 or later
- Opera v15 or later

Note: Javascript is required when using the UI. The following error will appear if you have disabled Javascript (check your browser configuration, plugins or security settings).



Language Selection for the Graphical User Interface

The UForge UI is accessible in different languages. You can select the language using the round flag options at the top right-hand of the UI, next to the sign-in button.



Note: The language choice is saved at the level of the browser and not of the user account.

Basic Concepts

Organization

UForge AppCenter is a multi-tenant platform which can serve multiple users. All the resources of the platform are held within an Organization. The organization contains:

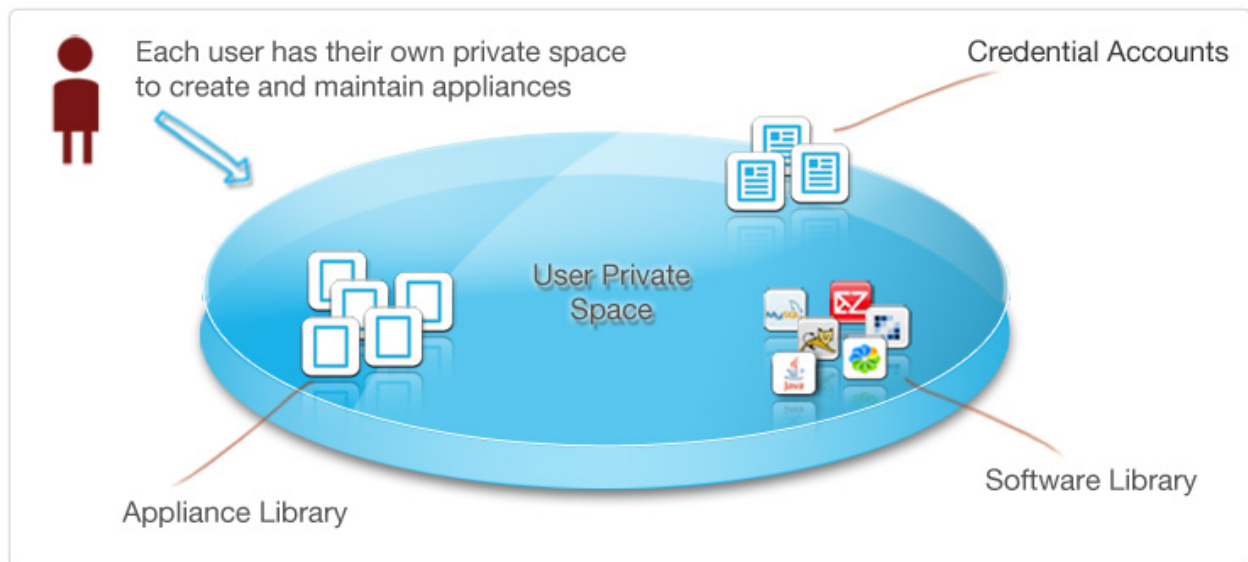
- One or more users
- One or more operating systems
- A project catalog containing software components that can be used by its users
- One or more formats available to generate images



User

Each user on the platform has:

- an **Appliance Library** containing all the appliance templates created by the user
- a **Software Library** (My Software) containing all the custom software uploaded by the user, which can be used in one ore more appliance templates
- a list of one or more **Cloud Accounts** to allow the user to publish and register generated machine images to various cloud and virtualization platforms



Appliance Templates

An Appliance Template is meta-data describing a software stack. It consists of five layers, namely:

- an `Install Profile` (mandatory) - specific information for the first time the image boots
- an `OS Profile` (mandatory) - a list of operating system packages. Each operating system within the organization provides one or more standard OS profiles to choose from when creating the OS Profile of the appliance template. It is also possible to create custom OS profiles.
- `Projects` (optional) - a list of Project software components chosen from the Organization's Project Catalog
- `My Software` (optional) - a list of software components chosen from the User's private "Software Library"
- `Configuration` (optional) - configuration information including boot scripts and/or other software components to manage the image after provisioning

Depending on the user's roles and privileges, the user may only have access to a restricted number of operating systems, projects and image formats the organization has to offer.

Using an appliance template, the user can generate machine images in different formats. For some formats, the user can publish and register machine images to a target cloud or virtualization platform. Each appliance template stores meta-data regarding each machine image generated and published.

Workspaces

Each user can also create and join **workspaces**. A workspace is an area for members to collaborate and share appliances. A workspace is created and maintained by users. The user can invite members to be part of a workspace. When the user invites a member that is not part of the UForge database, an email is sent to the new member to invite them to register on UForge.

The workspaces are listed under the `Collaboration` tab. Each workspace has:

- an activity stream, which lists the members' comments, the activities, such as invites and appliances shared
- a templates page, which lists all the templates shared with the people that are part of the workspace
- a members page where the user who created the workspace (the workspace administrator) can invite new members, delete members or change the role of a workspace member.

Members of a workspace are either:

- **Administrator**. This is generally the user who has created the workspace. There can be several administrators in a workspace. The administrator can invite or delete members and is able to delete a workspace. The administrator has all the same basic rights as the collaborator.
- **Collaborator**. The collaborator has the same basic rights as the Guest, but can also share templates.
- **Guest**. They can read and post to the activity stream, and import templates into their private appliance library.

Managing Appliance Templates

An appliance template is a meta-data description of an entire software stack. The following sub-sections go into detail on how to create and manage your appliance templates:

Supported Operating Systems

The following is a list of supported OSes that users can use as the guest operating system when creating their appliance templates.

OS	Factory	Migration
CentOS	5.2+, 6 (32bit and 64bit), 7 (64bit)	5.2+, 6 (32bit and 64bit), 7 (64bit)
Debian	6 (Squeeze), 7 (Wheezy), 8 (Jessie) (32bit and 64bit)	6 (Squeeze), 7 (Wheezy), 8 (Jessie) (32bit and 64bit)
Fedora	8 to 22	8 to 22
Open SUSE	11.3, 11.4, 12.1, 12.2 (32bit and 64bit)	11.3, 11.4, 12.1, 12.2 (32bit and 64bit)
Pidora	18 to 21	Not Supported
Raspbian	7	Not Supported
Red Hat Enterprise Linux*	5.2+, 6 (32bit and 64bit), 7 (64bit)	5.2+, 6 (32bit and 64bit), 7 (64bit)
Scientific Linux	5.2+, 6 (32bit and 64bit), 7 (64bit)	5.2+, 6 (32bit and 64bit), 7 (64bit)
Ubuntu LTS	10.04 (Lucid), 12.04 (Precise), 14.04 (Trusty) (32bit and 64bit)	10.04 (Lucid), 12.04 (Precise), 14.04 (Trusty) (32bit and 64bit)
Microsoft Windows Server	2008R2, 2012, 2012R2, 2016	2008R2, 2012, 2012R2, 2016

Note: For Red Hat Enterprise Linux you must provide the ISO images or access to a repository.

Warning: If you intend to generate machine images for cloud environments, ensure that the operating system you are using in the machine image is correctly supported by the cloud environment. For example, Microsoft Azure supports the following [operating systems](#).

Notes on Licensing

When using UForge, you have to comply with the license agreement of OSes and software which UForge handles, in particular:

- **Publishing OS image of RHEL (Red Hat Enterprise Linux) subscription to public cloud** Cloud provider has to be CCSP (Certified Cloud & Service Provider) and you must register to Red Hat Cloud Access. For more details, please confirm with cloud provider.
- **Scanning server** You have to check whether the licenses of OS and software which the source machine contains allow you to use them on the destination server which you are migrating to.

If the source machine contains rpm packages which Red Hat provides, please ask the administrator whether UForge repository contains these packages, because UForge automatically regenerates rpm packages which the repository doesn't contain and regenerated packages are NOT supported by Red Hat.

On UForge Portal, you can see the list of rpm packages which the source machine contains and header `In Repo` tells you whether or not the package comes from the repository (Refer to [Viewing a Scan](#)). Once migration is done, you can see where the package comes from by `rpm` command on the destination server. If regenerated, `Build Host` is overwritten as `uforge`.

- **Handling Microsoft Windows** UForge user must acquire Windows license in order to handle Windows OSes in UForge. When publishing Windows OS image or scanning Windows server, you have to confirm usage conditions of cloud provider and virtualization software which you publish to or scan.

Supported Machine Image Types

With UForge you can create machine images in the following formats.

Physical Format	Additional information
ISO	none

Virtual	Additional information
Hyper-V	none
KVM	none
OVF	Supported hardware types: 4 (ESXi >=3.x) 7 (ESXi >=4.x) 9 (ESXi >=5.x)
QCOW2	none
Raw	none
tar.gz	none
Vagrant Base Box	none
VHD	none
Virtual Box	none
VMware vCenter	Supported hardware types: 4 (ESXi >=3.x) 7 (ESXi >=4.x) 9 (ESXi >=5.x) For Windows, ensure your HW version is the most up to date for the ESXi host
VMware Server	Supported hardware types: 4 (ESXi >=3.x) 7 (ESXi >=4.x) 9 (ESXi >=5.x)
Vagrant	none
Xen	none
Citrix XenServer	none

Container	Additional information
Docker	none
LXC	none

Cloud	Additional information
Abiquo	Supported hardware types: 4 (ESXi >=3.x) 7 (ESXi >=4.x) 9 (ESXi >=5.x)
Amazon AWS	none
Azure Resource Manager	none
Cloudstack	Target formats: CloudStack VMWare (OVA) CloudStack Citrix Xen (VHD) CloudStack KVM (QCOW2)
Eucalyptus	Target formats: Eucalyptus KVM Eucalyptus Xen
Flexiant	Target formats: Flexiant RAW - KVM/Xen Flexiant OVA - VMWare Flexiant QCOW2 - KVM/Xen/VMWare
Fujitsu K5	none
Google Compute Engine	none
Microsoft Azure	none
Nimbula	Target formats: Nimbula ESX Nimbula KVM
OpenStack	Target formats: OpenStack QCOW2 OpenStack VMDK OpenStack VDI OpenStack VHD
SUSE Cloud	none
VMware vCloud Director	Supported hardware types: 4 (ESXi >=3.x) 7 (ESXi >=4.x) 9 (ESXi >=5.x)

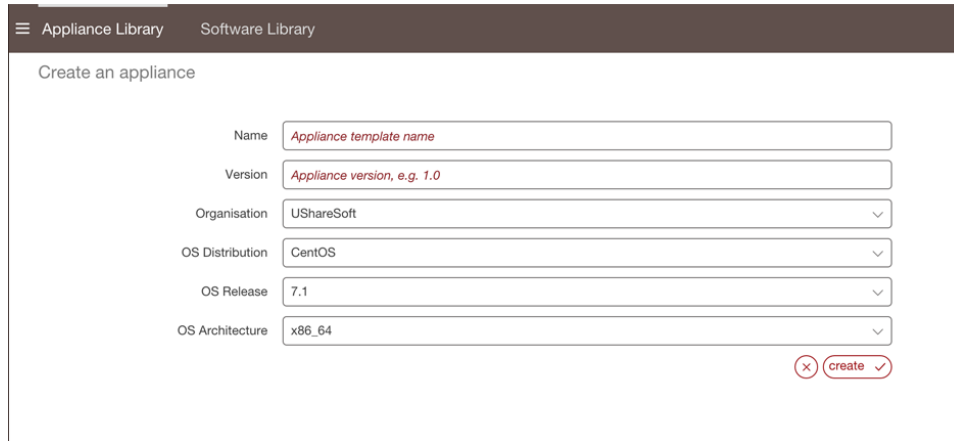
Creating an Appliance Template

You can create either Linux-based or Windows-based appliance templates. The steps differ slightly. Please refer to the appropriate section below.

Creating a Linux-based Appliance

To create a new appliance in your private workspace:

1. Select `Apps` icon on the left.
2. On the `Appliance Library` page, click on `create` in the top right.
3. Enter the `Name` and `Version` of the appliance.



4. From the drop-down menus, select the operating system (distribution, release and architecture).
5. Click the `create` button. This creates a skeleton of an appliance template in the platform which you can now customize with operating system packages, middleware and application software.

Note: If SELinux is installed (ie the file `/etc/selinux/config` exists), the filesystem will be relabeled on the first boot of a UForge generated machine image in order to add the SELinux context in the all system files 'extended attribute'. At boot time, `init.rc` checks for the existence of `/.autorelabel`. If this file exists, SELinux performs a complete file system relabel (using the `/sbin/fixfiles -f -F relabel` command), and then deletes `/.autorelabel`.)

6. You should now see the appliance overview page. You can add a description to your appliance (optional) and a logo (optional). The logo format must be `.jpg`, `.jpeg` or `.png`.
7. An OS profile is mandatory. See [Adding a New OS Profile](#). However, you can leave the appliance at this point and edit it later.
8. If you have made any modifications, click the checkmark to save.

Note: When you create an appliance, the packages are stored locally in the UForge cache repository. This ensures that the packages will always be available.

Creating a Windows-based Appliance

To create a Windows Appliance:

1. From the `Apps` tab, select `create`.
2. Enter the appliance name and version.
3. Choose `Windows` from the `OS Distribution` drop-down menu.

Appliance Library
Software Library

Create an appliance

Name

myWindowsApp

Version

1.1

Organisation

UShareSoft

OS Distribution

Windows

OS Release

Server2012R2

OS Architecture

x86_64

×

create

✓

- Select the Release and Architecture from the drop-down menus.
- Click `create`.
- From the `Stack` page, select the OS Profile from the drop-down list under `Profile name`. Click `save`.

Note: Once you have chosen the OS Profile, you cannot add any packages or run updates. The OS Profile is static. Once created, if you select OS Profile, you will only be able to view the details of the profile you selected.

Overview
Stack
Updates
Machine Images

Choose OS Profile

Configuration

Projects

My Software

OS Profile

Install Profile

Profile name *

Standard Full English

Edition

standard

Type

full

Language

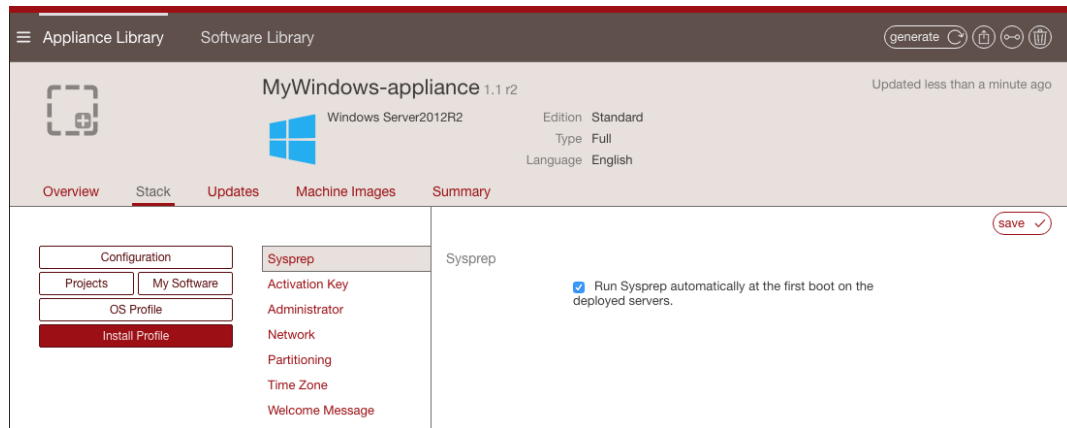
English

save

✓

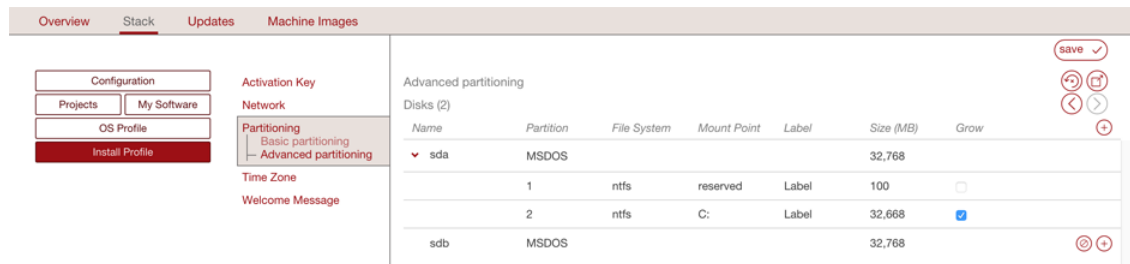
- Set the Install profile and click `Save`. For more information, refer to [Updating a Windows-based Install Profile](#).

Note: Unlike Linux, the following cannot be set for Windows appliances: Keyboard, Root user, User & Groups, Kernel Parameters and Firewall.



8. Optionally you can add partitions.

- Click on Partitioning and select Advanced Partitioning.
- Click on the green + sign at the top.
- You can modify the name and partition type
- Select the filesystem to ntfs and mount point to D : (for example).
- Enter the size. The install disk should be 12 Gb for core versions and not less than 32Gb for the full version.
- Check the box in the Grow column if you want the partition to be growable.
- Click save.



9. Add software bundles from the Projects or MySoftware pages.

Warning: Software bundles included in MySoftware and Projects will be put on the image disk but the UForge generation tool WILL NOT install them even if these are executable/installers files (.exe, .msi, etc.). It is up to the end user to manually complete the installation of the software bundles.

For Windows, .exe or .msi files can be given extra parameters. The parameters depend on the .exe or .msi file, and can be used for example for silent installation, providing extra configuration values, etc.

Note: A binary called UShareInstallConfig is embedded at generation time, which helps the final user of the Appliance do the last-mile configuration.

Note: A Windows appliance created using a golden image will not list the appliances and services under `Stack OS Profile`.

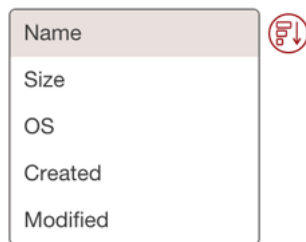
Searching for an Appliance Template

To find a particular appliance template you can:

1. Go to the Apps tab on the left sidebar.
2. Use the search engine. The search runs on the appliance name or the OS name. To use the search engine, enter the text in the filter field.



3. If you are in the grid view you can sort the appliances. From the drop-down menu select how you want to sort the appliances in your library.

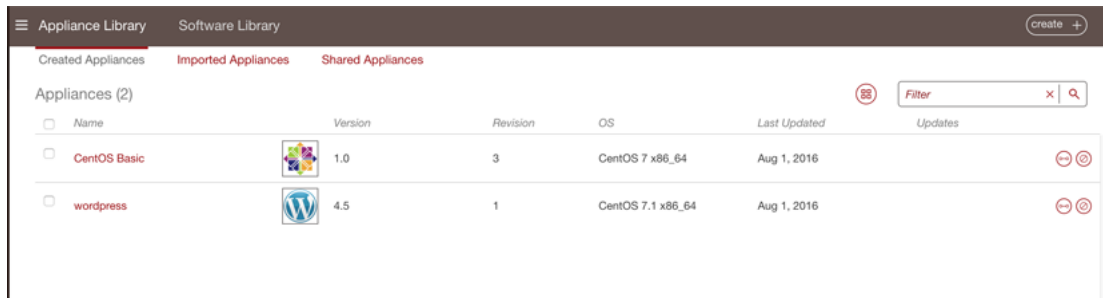


Listing Appliance Templates

To view the appliance templates you have access, go to the Apps tab in the user interface. By default the appliance templates are listed by latest first.

Under the `Appliance Library`, the appliances are organized as follows:

- `Created Appliances` are appliance templates you created
- `Imported Appliances` have been imported from a Collaboration workspace or from the UForge Marketplace if you have access to one
- `Shared Appliances` are appliance templates that you have shared to a Collaboration workspace or to the UForge Marketplace if you have access



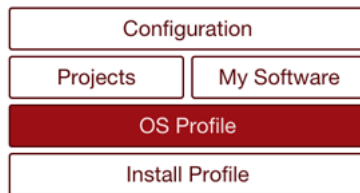
You can view the details of an appliance template, generate images from them and comment on them.

Modifying an Appliance Template

You can modify and update appliances that are in your library, including ones that have been imported.

To modify an appliance template:

1. Click on the appliance template to modify.
2. From the Overview page you can add or change the logo, modify the name, version or description.
3. On the Stack page, you will notice the appliance toolbox on the left-hand side.



The toolbox allows you to define the five key elements of an appliance, namely:

- **Install Profile** – to customize the questions asked when the image is booted for the very first time (or during installation for an ISO image). It also allows you to customize the disk size and partitioning. For more information see [Updating the Install Profile](#).
- **OS Profile** – (mandatory) to choose the operating system packages that are to be used for the appliance. For more information, see [Managing the OS Profile](#). Note that the OS Profile cannot be modified for Windows-based appliances. Refer to [Modifying a Windows-based Appliance](#).
- **Projects** – to access the UForge Project Catalog. This catalog provides a set of commonly used 3rd party software components when building appliances. The Project Catalog is maintained by the UForge administrator. To add software from the Project Catalog to an application, see [Adding Software from the Project Catalog](#)
- **My Software** – to add to the appliance any software components that you have uploaded. This is also where you can use the Overlay features to manage where the files are installed during generation, if UForge should unzip archives as part of the generation, and set if UForge should on the contrary not install native OS packages. For more information, see [Adding Software from Your Software Library](#)
- **Configuration** – to add boot scripts to configure the appliance after provisioning. For more information, see [Managing Configuration](#)

Adding a Logo

You can add or modify the appliance logo as follows:

1. Click on the appliance to modify.
2. From the `Overview` page click on the square and plus (+) image on the left hand-side.
3. Select the image you want to use as the logo. The format must be .jpg, .jpeg or .png.
4. Click `ok` and save.

Managing the OS Profile

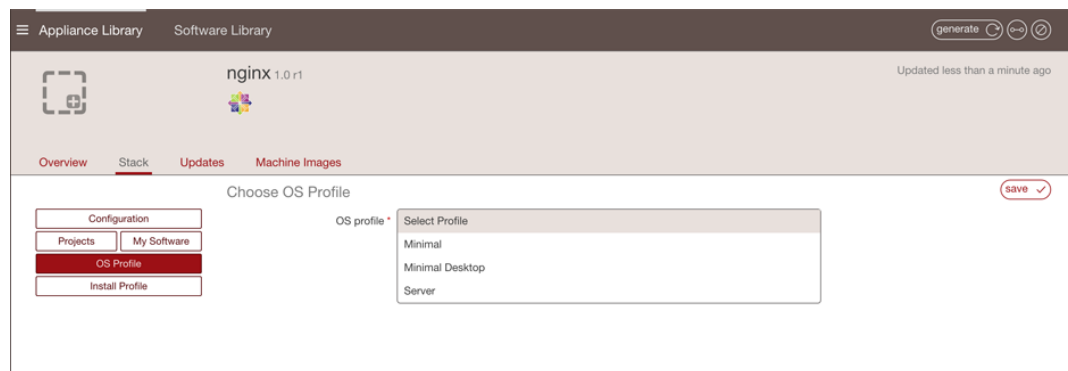
Adding a New OS Profile

Every appliance must have an OS profile, which contains all the operating system packages for the appliance. UForge allows you to easily create an OS profile from a set of standard profiles. You can then add specific operating system packages.

The goal is to only include the operating system packages you require to run your application. This process is known as JeOS (Just Enough Operating System). By only using the operating system packages you need, not only do you reduce the footprint of the resulting machine image, you also make the machine image easier to maintain (as there are less updates) and (hypothetically) more secure as there will be less unwanted services started.

To add an OS profile to your appliance:

1. Double click on the appliance you want to edit.
2. Go to the `Stack` page.
3. Click on `OS Profile` in the toolbox.
4. From the drop-down menu, select the `OS profile` template you wish to use. The operating system packages are added automatically and your appliance revision number is increased.



Adding Packages to the OS Profile

You may want to add packages that are provided as part of the operating system distribution. To get a list of all the packages that correspond to your search criteria:

1. Select the appliance to modify and go to the `Stack` page.
2. Click on `OS Profile` in the toolbox.

3. Click on the `search` button in the top right hand.
4. Enter your search string. For example, add `php` as a search string to get a list of all the PHP packages provided by CentOS.
5. Click the search icon.



Search for Packages

php

☐ Show only 32-bit packages

6. Optionally you can filter the results by selecting `Show only 32-bit packages` (this displays only 32bit packages available) or by entering text in the `filter` box.
7. Select the packages you want to add.
8. Click the `save` button to add the packages to the OS profile.

Note: When you create an appliance, the packages are stored locally in the UForge cache repository. This ensures that the packages will always be available. However, UForge tracks all available updates.

For more information on package updates, see [Tracking OS Package Updates](#). If you want to make sure you always have a specific version of a package, read [Pinning Packages](#).

Generating a Machine Image

Once an appliance template has been created, you can generate a machine image that packages the stack to run on a particular virtual, cloud, container or physical environment. For a complete list of supported machine image formats, refer to [Supported Machine Image Types](#).

To generate a machine image:

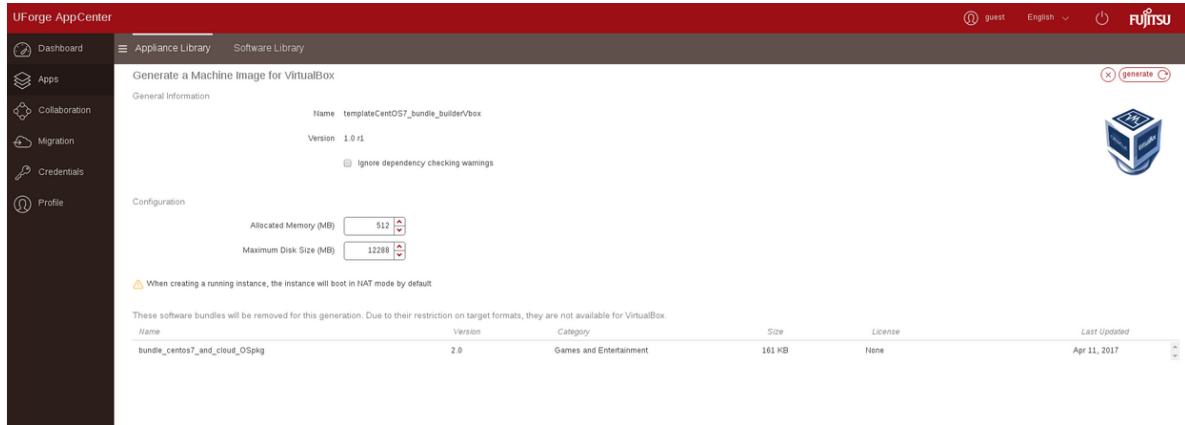
1. Go to the `Apps` tab.
2. Select the appliance from the `Appliance Library`.
3. Click on the `generate` button at the top right to display all possible image formats which can be generated. The formats are organized by type: Cloud, Container, Virtual, Physical.
4. Choose the image format you would like to generate. For a Docker image, refer to [Generating a Docker Image](#).

Note: For Windows appliances, if you are generating an image for VMware vCenter make sure that your generated image's hardware version is the most up to date for the ESXi host that you are using for publish. For more information please refer to [VMWare recommendations](#)

5. You will see a recap of the image you are about to generate.

Note: If you want to ignore dependency checking during image generation (for example because you have knowingly removed a package dependency that is not required in your environment), then you check the option `ignore dependency checking warnings`. Note that this is an advanced option and should not be used systematically.

Warning: If your software bundle is limited to a certain target format and you generate an image in another format, your appliance will be generated but the software bundle will not be part of the final image. A note indicating this will appear when you select to generate the machine image, as in the following image.



6. You can set the disk size, then click the `generate` button to launch a generation in UForge for this appliance template.

Note: Depending on the packages you install and the size of your software, make sure that the disk size is large enough to accommodate the software to be installed. For Windows-based operating systems, it is advised to have a disk size of at least 14GB for core versions, and at least 20GB for full versions.

The generation will take a few minutes to complete (depending on the number of packages in the appliance template and the disk size chosen). The generation progress is shown.

Note: Some services are disabled or enabled depending on the target machine image being created (refer to [Changes to Service State Based on Target](#)).

Once the generation is complete, you can download the image locally, or for certain cloud formats register the machine image directly to the target environment using your cloud credentials.

You will note that a package `uforge-install-config` is injected in the generated image. This file is responsible for:

1. launching the dialog for the install profile configurations which are not automatic (keyboard, root password, licenses, time zone, static IP)
2. executing the installation bootscript of the template

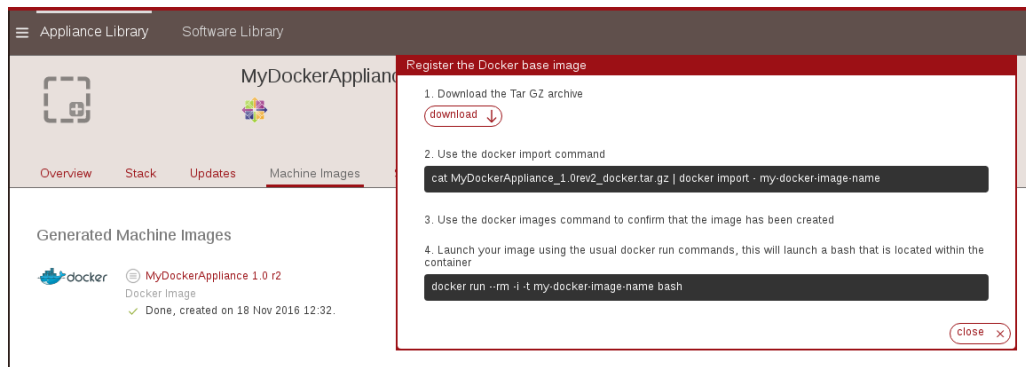
If the template is configured to be fully automatic in the `Install Profile` and has no bootscript that is supposed to run at every boot, the `uforge-install-config` package and associated `/etc/UShareSoft` directory can be removed safely.

However, it is preferable to leave this file.

Generating a Docker Image

To generate a machine image:

1. Go to the Apps tab.
2. Select the appliance from the Appliance Library.
3. Click on the generate button at the top right to display all possible image formats which can be generated.
4. Choose Container, then Docker image format.
5. You can set the disk size, then click the generate button to launch a generation in UForge for this appliance template. The following pop-up will be displayed once the generation ends on the summary view.



5. As indicated in the pop-up, you need to click download to download the tar.gz.
6. Run the appropriate docker import command to create the image. The appliance and docker image name will depend on the name you have given them.
7. You should now be able to see the Docker image in your library.

Changes to Service State Based on Target

When generating a machine image from a scan, certain services are disabled or enabled depending on the target machine image being created. The following changes are common to all formats:

- libvirtd disabled
- sshd enabled
- rewrite grub configuration and initramfs/initrd

If after all service modification, networking services are not enabled, then NetworkManager is enabled if the package is present, otherwise network is enabled.

Note: NetworkManager is the name used by some operating systems which is the equivalent to network-manager. The name network is used by some operating systems which is the equivalent to networking.

EC2 AMI Image

- hal disabled
- haddaemon disabled

- network enabled
- iptables disabled
- ip6tables disabled

OpenStack Image

- hal disabled
- haddaemon disabled
- network enabled
- ip6tables disabled
- iptables disabled

Microsoft Azure Image

- networkmanager disabled
- network enabled

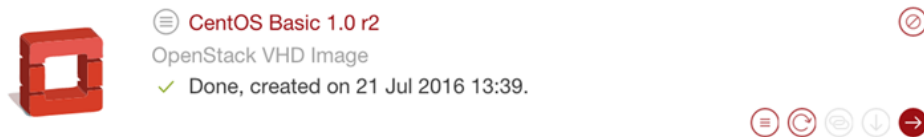
Publishing a Machine Image

Note: When publishing an image, you have to comply with the license agreement of OSes and software which UForge handles, in particular:

- **Publishing OS image of RHEL subscription to public cloud** Cloud provider has to be CCSP (Certified Cloud & Service Provider) and be registered to Red Hat Cloud Access. For more details, please confirm with cloud provider.
- **Publishing Windows OS image** You must acquire Windows licenses in order to handle Windows OSes in UForge and confirm usage conditions of cloud provider and virtualization software which you publish to.

In order to publish a machine image to a cloud environment or container, you must already have credentials to access that environment.

1. If not already done, create an account for the target environment. For more information, see [Managing Cloud Accounts](#).
2. Go to the appliance and click the **Machine Images** page. If you have not generated a machine image, you will need to do so as described in [Generating a Machine Image](#).
3. Click on the arrow pointing to the right to publish your image.



4. Following the instructions, choose the account and fill in any additional information required.
5. Click **publish**.

Note: Publishing an image to Amazon will launch an instance and therefore will be billed to the user account. Azure trial accounts are not supported for publishing images from UForge. Only full Azure accounts can be used.

Note: Currently, publication to Docker are only supported for Docker Registry v2.

6. The publication will take a few minutes to complete (depending on the size of the image and the network connectivity between UForge and the target environment). The publication progress is shown. At the end of the publication, the machine image has been published by UForge to your target environment. The published image can be found in the target cloud environment or container.

UForge does not launch instances in the target cloud environment. If you wish to launch an instance from this machine image, you should go to your target cloud environment console for further actions.

Note: When you publish an image to VMware, the result will be a template and not a virtual machine.

Warning: If your Fujitsu K5 publish failed, there may be data published to cloud, incurring costs, even if not visible on your cloud account. You should run a cleanup manually. Refer to [Chapter 2.7 Object storage](#)

Tracking OS Package Updates

All the OS packages added to the `OS Profile` section of the appliance templates are tracked for any updates by UForge AppCenter. Based on a timestamp stored in the appliance template, UForge AppCenter can detect any OS package updates that are available. Updates are displayed in the user interface for each appliance template.

If you are in grid view:



6

If you are in table view, it is listed in the `Updates` column:

Appliance Library						
Software Library						
Created Appliances Imported Appliances Shared Appliances						
Appliances (4)						
<input type="checkbox"/>	Name	Version	Revision	OS	Last Updated	Updates
<input type="checkbox"/>	CentOS Basic	1.0	5	CentOS 7 x86_64	Aug 1, 2016	6
<input type="checkbox"/>	nginx	1.0	1	CentOS 7.1 x86_64	Aug 1, 2016	

You can then easily update the packages using the UForge GUI. Using this tool, you can also roll-back to previous versions of OS packages.

Note: This feature is only available for appliance templates using Linux operating systems.

To update the OS packages:

1. Select your appliance from your appliance library under the `Apps` tab.
2. Go to the `Updates` page.
3. You can see from the graphic when updates were made and how many are available.



4. You can select current updates (if any) or select to return to a previous version of the OS by moving the cursor on the graph.
5. Click `simulate` to see the changes that will be applied. The changes will be listed at the bottom of the screen. Scroll to view the results.
6. If you want to apply the changes listed, then click `update`.

Note: The triangle indicates a Milestone. For CentOS, this is the versions (6.1, 6.2 etc). Milestones are customized by the UForge administrator.

Modifying a Windows-based Appliance

For Windows-based appliances UForge will indicate the number of updates available, however you cannot use this procedure to update the packages for an existing Windows appliance.

In order to benefit from a newer version of Windows, you will have to:

1. Create or retrieve a new Golden Image. See your administrator.
2. Create a new appliance.
3. You can re-use the MySoftware components contained in the current appliance.
4. You can download from the current template the boot scripts and save them on your local hard drive. You can then upload them to the new appliance.
5. You must re-produce the configuration (Install Profile, Configuration).

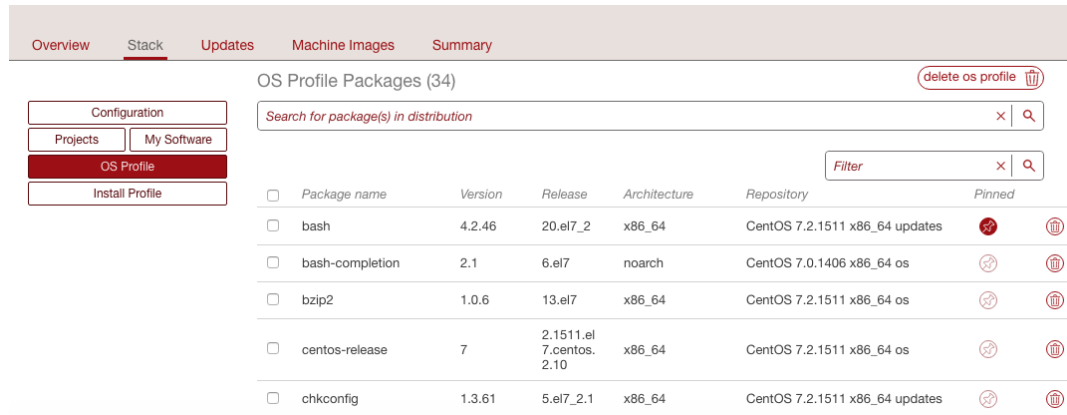
Pinning Packages

UForge allows you to “pin” certain packages in your appliance (previously referred to a “sticky” package). This means that during image generation, the package version you have pinned is chosen regardless of the current appliance template timestamp for calculating package versions. All the package dependencies of this package are also calculated.

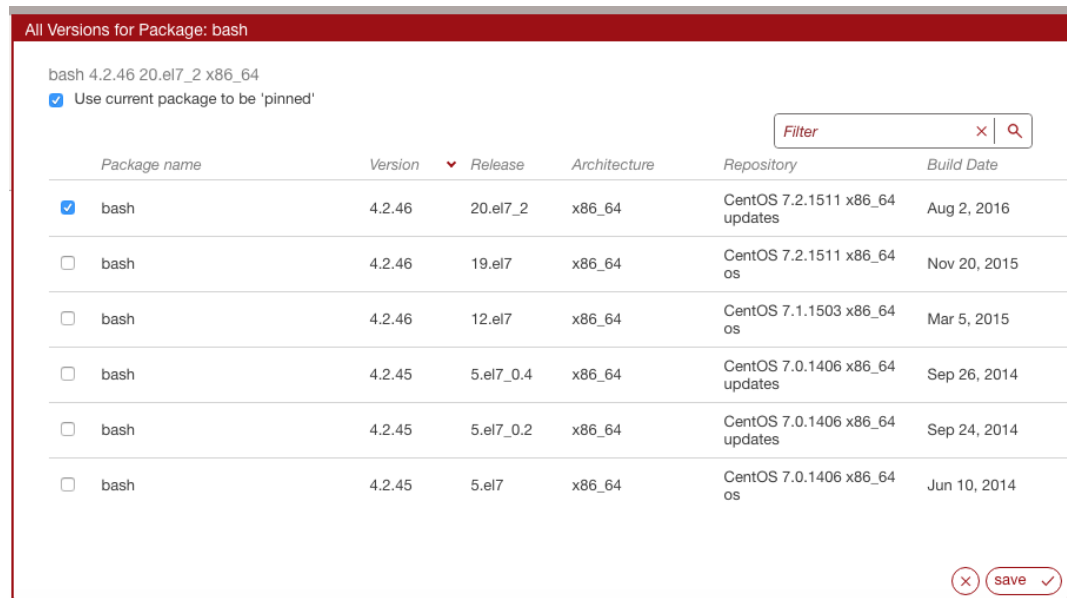
To pin a specific package:

1. Select the appliance you want to modify.
2. Go to the `Stack` page.

- From the OS profile, click on the pinned bar in the right hand side of the package info. In the following image, the first package has been pinned.



- A pop-up window will list all of the versions of the package available, allowing you to select the version you want to pin.



- Choose the version of the package you want to pin, then click **save**.

Adding Custom Software Components

There are two ways to add 3rd party software components or your own software to an appliance template.

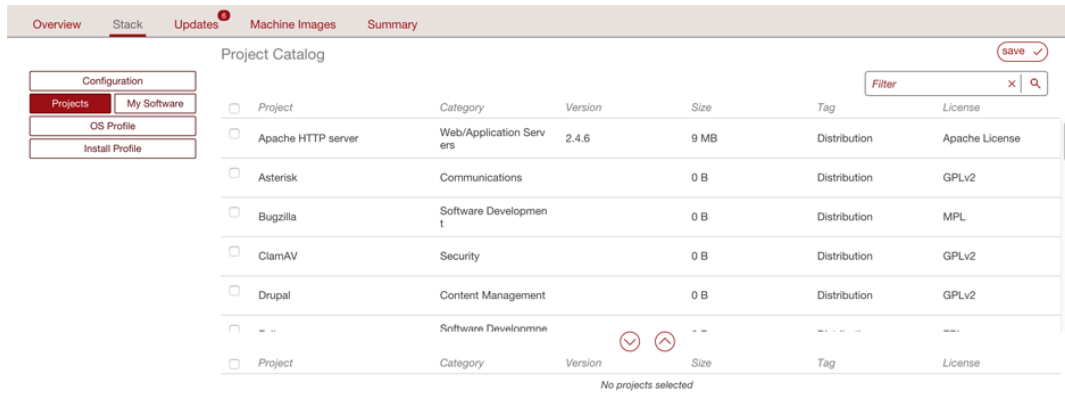
The first way is through the **Project Catalog**. This catalog is public to all the users on UForge and is maintained by the privileged users and administrators.

If the catalog does not contain the software component you are looking for, then you can upload the software into the **My Software** library. This is your own private software library, allowing you to upload any software into UForge and be able to add it to any of your appliance templates.

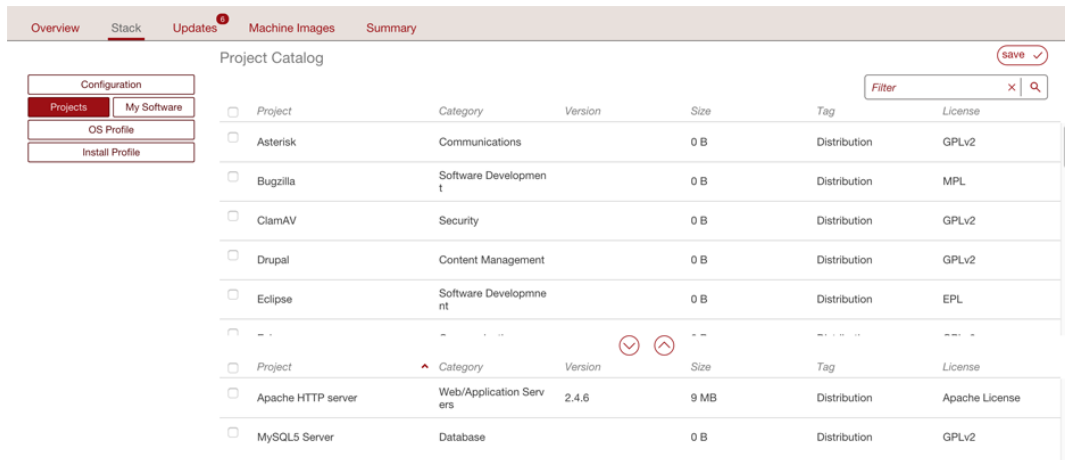
Adding Software from the Project Catalog

The following describes how to add MySQL and Apache to an appliance.

1. Select the appliance to modify and go to the `Stack` page.
2. Click on the `Projects` in the toolbox. This displays the Project Catalog. The bottom table lists which projects have already been added to the appliance.



3. Select the projects, for example Apache and MySQL and click the down arrow button. You can scroll through the available projects or enter a search string to filter the list.
4. Click Save. These projects should now be displayed in the second table.



Adding Software from Your Software Library

You can add your own custom software either using the Software Library or by including boot scripts. My Software overlay files (for example `/etc/profile.d/xxx.sh`) will be run before bootscripts when the machine is booted.

The following is a list of supported file formats:

- Linux only, note by default `.rpm` and `.deb` files will be installed at generation. This can be modified when you upload the files (see procedure below):
 - `.rpm` ("`rpm i`" will be executed)
 - `.deb` ("`dpkg -i`" will be executed)

- **Windows only:**

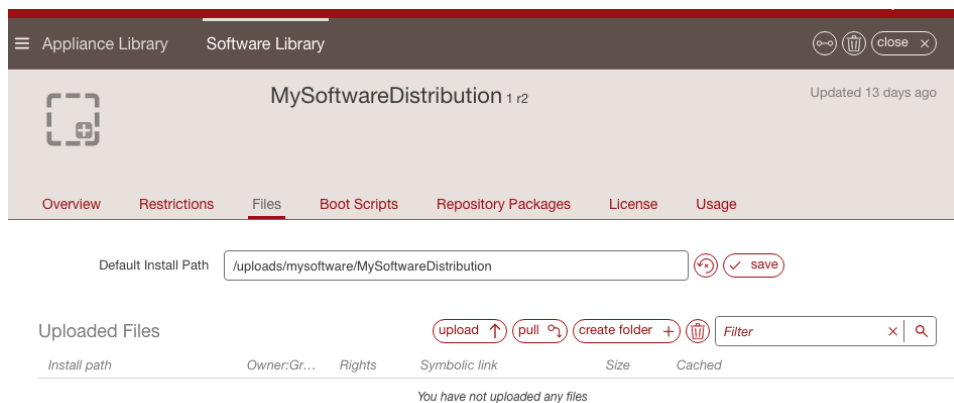
- .msi
- .exe

- **Linux and Windows compatible:**

- .tar.bz2
- .bz2
- .tar.gz
- .tgz.bz2
- .tgz
- .gz
- .tar
- .zip
- .tar.zip

To add custom software components to an appliance:

1. From the Apps tab, click on `Software Library` in the top left hand side of the UI. This opens your private `Software Library`.
2. Click on the `add software` in the top right hand side.
3. You are now prompted for the name, version and maintainer of the software component you would like to add. You can also set a tag and category. Click `create` to complete.
4. The software `Overview` page will now open. You can modify the name and version, and add a description.
5. To upload the files, go to the `Files` page.



Note: If you want to group a set of files, you can create a folder by clicking `create folder`. Then enter a folder name and click `create folder`. Now if you want to put files in this folder, click on the upload icon next to the folder name.

If you create a folder, you can then click on the pencil icon to edit the file properties. Here you can select to apply the same owner and rights to all the files added to the folder.

Edit the software component

File Path *

Owner:Group *

Rights *

☐ Apply same "owner:group" and "rights" recursively to all files and folder below this one ?

Symbolic link

You can now upload the files as follows:

1. Click `upload` to select the files you want to add and click `open`.
2. Click `fetch` to set an archive location where the files should be retrieved. When using the `fetch` option you can indicate a remote URL or artifact account (for information on artifact accounts, refer to [Managing Your Artifact Accounts](#)). You can also select to have the files uploaded to the UForge by checking `use cache`.

Fetch a new remote file

Choose the way to fetch

☒ Fetch from existing account

☐ Fetch directly from URL

Artifact account *

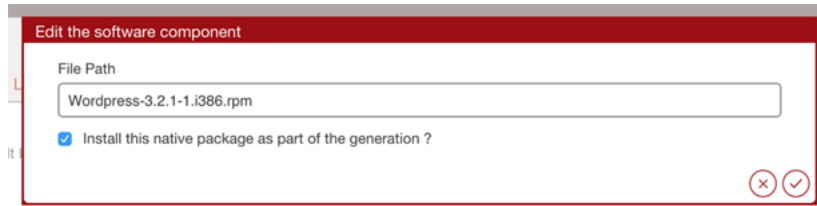
Remote path: e.g. /remote/path/folderName/ (keep "/" for a folder or add filename e.g. filename.zip for a file)

Remote file path *

Use cache ☒

6. Optionally, you can modify the default `install path` that will be used. If you have modified the name of your appliance, it may not be reflected in the install path.
7. By default `.deb` and `.rpm` files will be installed at generation time. Optionally you can edit the settings for those files
 - Click on the pencil on the right hand side of your uploaded file.
 - Un-select `Install this native package as part of the generation`.
 - Click the check mark to save your changes.

In this case, the `.deb` or `.rpm` archive file will be in the directory but will not be installed at generation time.



8. Optionally, you can select to unzip archives as part of the generation. To do so:

- Click on the pencil on the right hand side of your uploaded file.
- You can then edit the install path and select if it should be extracted.
- Click the check mark to save your changes.



9. From the **Restriction** page, you can set the distributions with which your software is compatible. By default, all the distributions listed in the bottom table are compatible. If you want to remove a distribution from the list, select and click the up arrow and **save**.

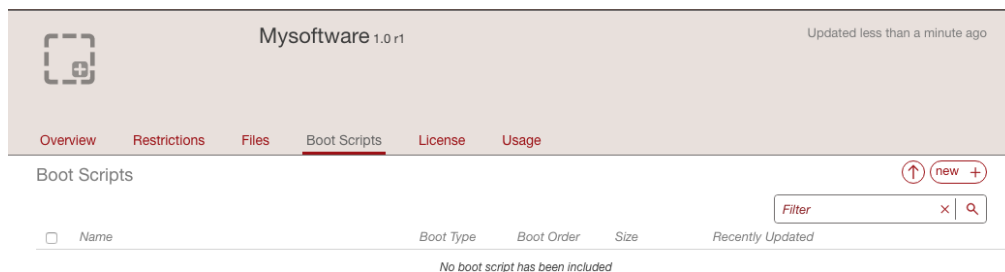
Note: If you remove all the distribution compatibility, the software will not be visible for any appliances.

10. From the **Repository Packages** page, you can set the packages with which your software is compatible. This page will only be visible if you have selected only one distribution. You can search for packages. Select and click the down arrow to add them. Click **save**.

11. You can (optionally) restrict the distribution or target format that the software applies to, from the **Restrictions** page. The restriction rule is set as a regular expression. For more information, refer to [Restricting Software Components for Oses and Formats](#). Click **save**.

12. **From the **Boot Scripts** page, upload any boot scripts you want to add to this software. You can either:**

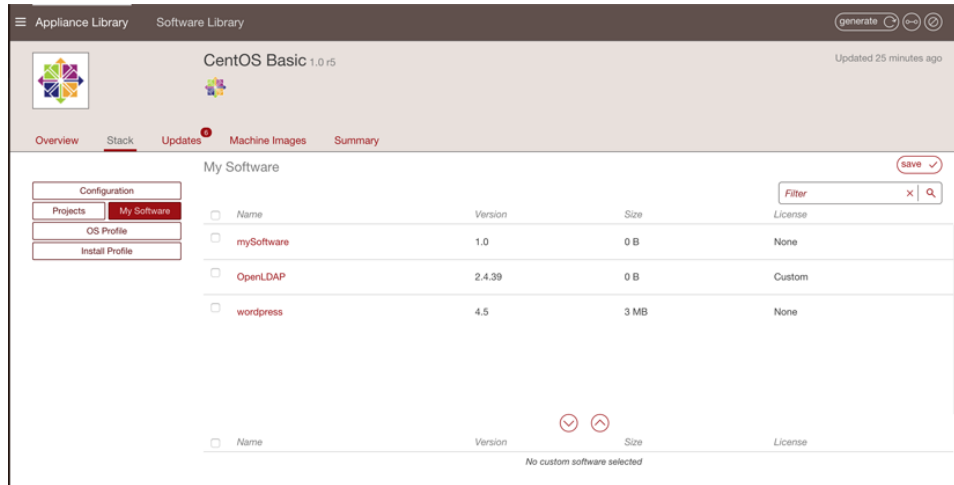
- Upload an existing boot script file by using the **upload** icon.
- Create a new boot script by clicking **new**.



In both cases, you must select the type. If you select **first boot**, then the boot script will be launched once, the first time the instance is launched. If you select **every boot**, then the boot script will be

launched every time the instance is rebooted. You must also set the boot order.

13. From the `Licenses` page, upload any licenses you want to add to this software. Click `upload`, select your license and click `save`.
14. Add the uploaded software component to the appliance. Click on the `Appliance Library` to view your `Appliance Library`. Double-click on the appliance template you want to add the software to.
15. Go to the `Stack` page and click on the `My Software` button in the toolbox.



16. Select the software components you want to add and click the down arrow button.
17. Click `save` to add this software component to your appliance template.

Restricting Software Components for OSES and Formats

Under `My Software` you can restrict the usage of a software bundle based on a distribution name, family, architecture or for a specific machine image format.

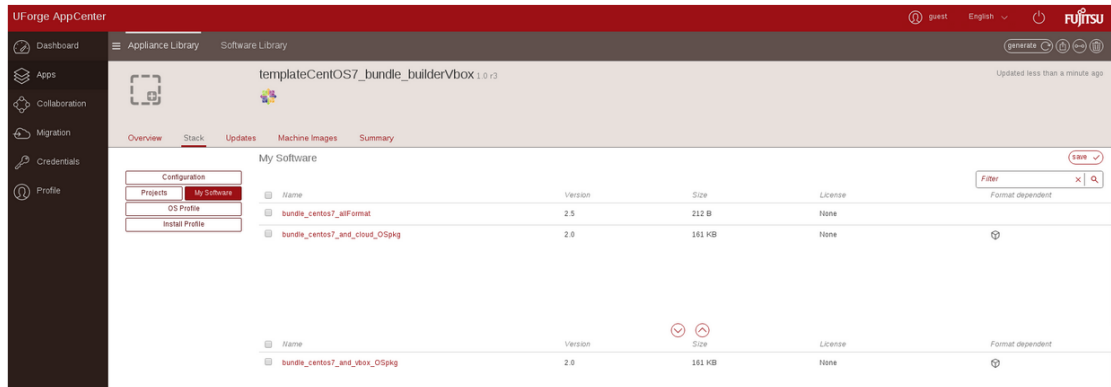
To set restriction rules:

1. Under the `Apps` go to the `Software Library` page.
2. Select the software you want to modify.
3. **Go to the `Restrictions` tab. Enter the restriction rule. The restriction rule is represented by a logical expression with the following fields:**
 - `object` is either `Distribution` or `TargetFormat`
 - for `Distribution` field is `family`, `pkgType`, `name`, `version` or `arch`. The `version` must be a major version.
 - for `TargetFormat` field is `name` or `type`
 - `value` is the value you want to match with the fields. For example, `CentOS` for `Distribution` name, `linux` for `Distribution` family, `x86_64` for `Distribution` arch, `VirtualBox` for `TargetFormat` name, `cloud` for `TargetFormat` type.
 - logical operator is `||` for OR and `&&` for AND
 - carriage return is not authorized

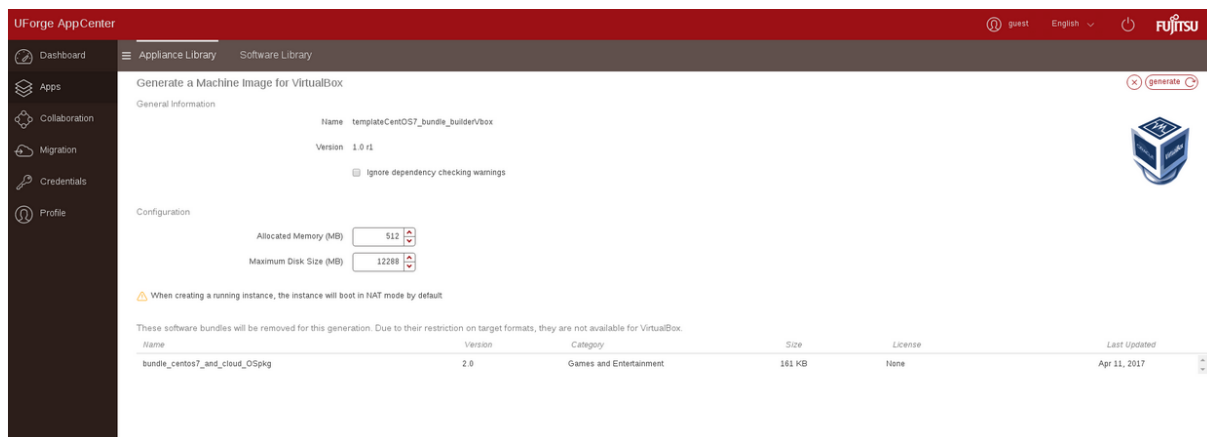
For example, if the software bundle is designed only for distributions CentOS 7 x86_64 or Debian 8 x86_64, or for image format with type virtual, then you would note the Restriction rule as follows:

```
(Distribution#arch=x86_64 && ((Distribution#name=CentOS && Distribution#version=7) ||
↪ (Distribution#name=Debian && Distribution#version=8))) || TargetFormat#type=virtual
```

Once you have set a restriction rule, you will see a cube next to the software component, under the column Format dependent.



Warning: If your software bundle is limited to a certain target format and you generate an image in another format, your appliance will be generated but the software bundle will not be part of the final image. A note indicating this will appear when you select to generate the machine image, as in the following image.



Updating the Install Profile

The Install Profile on the Stack page allows you to customize the questions asked when the image is booted for the very first time (or during installation for an ISO image). The install profile is mandatory. However, the options you set will differ depending on if you appliance in Linux-based or Windows-based. Please refer to the appropriate section below.

Updating a Linux-based Install Profile

You can define the following as part of a Linux-based appliance install profile:

- **Root User:** The root user password by default is prompted during the first boot of the machine image i.e. ask during installation. However, you can pre-set a root password. You can enter an SSH key to allow users to login as root. If you select `Disable root password login via SSH`, root will still be able to login from the console.
- **Users and Groups (optional):** you can add operating system users and groups. See [Adding Users and Groups](#) for more information
- **Network:** You can set the internet settings. The default is set automatically. See [Configuring Multiple Network Internet Cards](#)
- **Security:** You can activate or deactivate the firewall present in the filesystem when launching the appliance (regardless of whether the firewall is iptables or other). Firewall is set to `Off` by default. You can also set the SELinux configuration [here](#).
- **Partitioning:** You can modify the disk and swap size for the automatic set up, select ask during install, or set up Advanced Partitioning (for several disks). For more information see [Configuring Advanced Partitioning](#).
- **Kernel.** You can add kernel parameters by clicking plus, entering data and click save.
- **Keyboard:** default is ask during installation. You can choose set automatically and select the keyboard from the drop down menu.
- **Licenses:** default is accept licenses during installation.
- **Time Zone:** default is set automatically to London.
- **Welcome Message:** You can enter a welcome message.

Note: For basic partitioning disk size, you must ensure that the disk is large enough to store all the binaries and files for the appliance template. For windows based operating systems, it is advised to have a disk size of at least 14GB for core versions, and at least 20GB for full versions.

Adding Users and Groups

You can add operating system users and groups to a Linux-based appliance Install Profile. These will be integrated to the appliance template.

Warning: The users and groups created in UForge are not linked. If you create a user and list it as part of a specific group, you must then also create the group; otherwise the image generation will fail.

To add a user to an appliance:

1. Select the appliance template you want to modify.
2. From the `Stack` page, click on `Install Profile` in the toolbox.
3. Select `Users and Groups`.
4. Click the plus symbol next to the `Users` table. The `Create User` page will be displayed.

Create user

User *

Full name *

System User ☐ Mark this user as being a system user

User id ☒ Set the user id automatically

1000

Shell * /bin/bash

☐ No console login

Home Directory

Primary Group ☒ Automatically create primary group for user

Secondary Groups Secondary groups for the user (e.g. grp1, grp2, grp3, etc.)

Password

Verify Password

create +

5. Enter a user name.
6. If you want to manually enter the user ID, deselect set the user id automatically and enter the ID number.
7. If you want to manually create the primary group the user is part of, deselect automatically create primary group for user and enter the group name.
8. Click create.

Warning: If you create a user and list it as part of a specific group, you must then also create the group; otherwise the image generation will fail.

To add a group to a Linux-based appliance install profile:

1. Select the appliance template you want to modify.
2. From the Stack page, click on Install Profile in the toolbox.
3. Select Users and Groups.
4. Click the plus symbol next to the Groups table. The Create Group page will be displayed.

Create Group

Name

System Group ☐ Mark this group as being a system group

Group id ☒ Set the group id automatically

1000

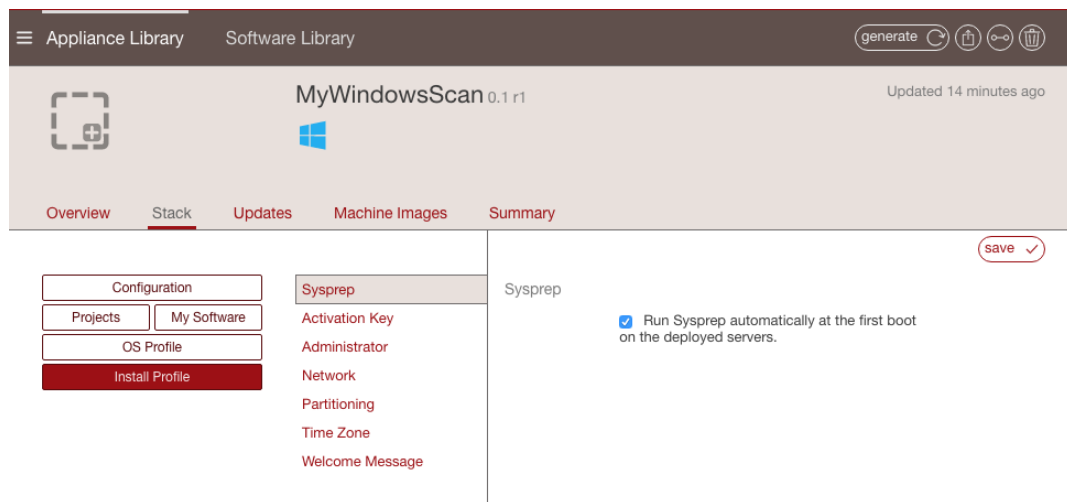
create +

5. Enter a group name.
6. Check if you want this group to be a system group.
7. If you want to manually enter the group ID, deselect Set the group id automatically and enter the group ID number.
8. Click create.

Updating a Windows-based Install Profile

You can define the following as part of a Windows-based appliance install profile:

- **Sysprep:** Allows you to indicate that sysprep should be run on first boot. If you do not select to run sysprep, you cannot set a Admin root login as Administrator option will not be visible.
- **Activation Key:** You can set the Windows Activation Key. If it is not entered in the Install Profile, the default key will be used for a 30-day trial period once the appliance is booted.
- **Administrator:** To set the administrator root login. Can be one of Ask during installation, None or Set automatically. Note that this option is visible only if you have selected to run sysprep under Sysprep option.
- **Network:** You can set the internet settings. The default is set automatically. See [Configuring Multiple Network Internet Cards](#)
- **Partitioning:** You can modify the disk and swap size for the automatic set up, select ask during install, or set up Advanced Partitioning (for several disks). For more information see [Configuring Advanced Partitioning](#).
- **Time Zone:** default is set automatically to London.
- **Welcome Message:** You can enter a welcome message.



Configuring Multiple Network Internet Cards

You can configure multiple network internet cards (multi-NIC) as part of your appliance template in the `Install Profile`. This is only available for Linux-based appliances.

To set multi-NICs for an appliance template:

1. Select the appliance you want to modify.
2. From the `Stack` page, click on `Install Profile` in the toolbox.
3. Select `Network`.
4. Click `create`. By default it is set to `Automatic`.

5. Select Manual. The following page will appear.

6. Enter the name and IP information.

7. Click save.

8. Optionally you can change the network card order. Click on the symbol on the left of the pencil icon, on the main Network page.



Configuring Advanced Partitioning

You can configure advanced partitioning as part of your appliance template in the `Install Profile`. The elements you can configure will depend if your template is Linux or Windows based.

Advanced Partitioning for Linux

The following example assumes that you want to build the following partitions, with a virtual hard drive of 20 GB.:

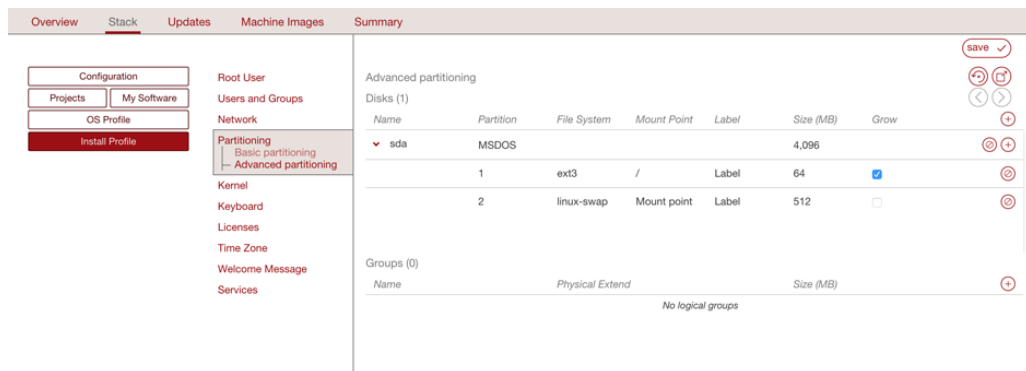
```
part /boot -fstype=ext4 -size=500 -ondisk=sda
part pv.1 -grow -size=1 -ondisk=sda
volgroup ROOTVG -pesize=4096 pv.1
logvol / -fstype=ext4 -name=LogVolROOT -vgname=ROOTVG -size=3072
logvol swap -name=LogVolSWAP -vgname=ROOTVG -size=1024
logvol /usr -fstype=ext4 -name=LogVolUSR -vgname=ROOTVG -size=5120
logvol /var -fstype=ext4 -name=LogVolVAR -vgname=ROOTVG -size=1024
logvol /home -fstype=ext4 -name=LogVolHOME -vgname=ROOTVG -size=5120
logvol /tmp -fstype=ext4 -name=LogVolTMP -vgname=ROOTVG -size=1024
logvol /opt -fstype=ext4 -name=LogVolOPT -vgname=ROOTVG -size=1024
```

To set advanced partitioning for an appliance template:

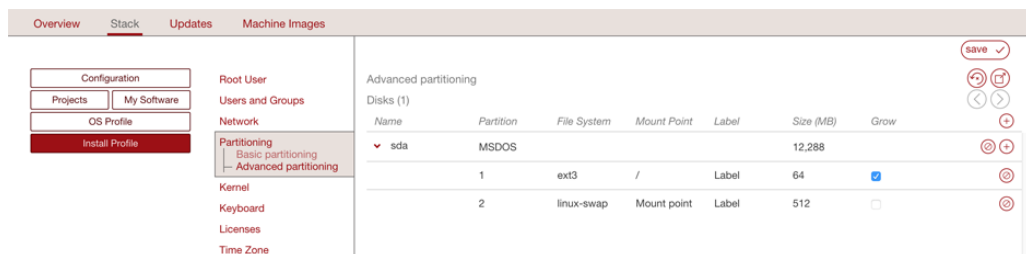
1. Select the appliance you want to modify.
2. From the **Stack** page, click on **Install Profile** in the toolbox.
3. Select **Partitioning**, then **Advanced Partitioning**.

Note: In order to view the information more easily, you can click on the enlarge button in the top right. This opens a separate window where you will see all the advanced partitioning.

4. Advanced partitioning works sequentially, from top to bottom. The three sections offered by the UI, which are **Disks**, **Logical Groups**, and **Logical Volumes** should be filled in order, sequentially:
 - disks with partitions including the total virtual disk size required
 - logical group(s), assigning the associated physical extent (partition)
 - specify the logical volume specification for the created logical group(s)



5. Click on the arrow in **Disks** next to **sda**. You will see the default disks.



6. Delete the default `linux swap` partition by clicking the x at the end of the line with `linux-swap`. You must not set the swap size to 0.
7. Click on the size of the `MSDOS` partition to set it to 20000.
8. Click on the partition 1 information to modify the file system to `ext4` and the mount point to `/boot`.
9. Click on the + sign to create a new partition with type `lvm2` and size set to 18000 MB.
10. Unselect `Grow` and set the size of the `/boot` disk to 500.
11. In the `Logical Groups` section, click on the + sign and set the name of the logical group. For this example: `ROOTVG`.

Note: Image generation will fail when migrating if the volume group name set in the Partitioning Table is the same as the name of LVM volume group in UForge server.

12. Next to the newly created volume group, click on the + sign to create a new volume extent. A pop-up window will appear proposing a `sda/2` physical extent with size automatically set to 18000 MB. Click ok.

The screenshot shows the 'Edit Advanced Partitioning Table' window. It contains three main sections: Disks (1), Groups (1), and Volumes(2).

Disks (1)

Name	Partition	File System	Mount Point	Label	Size (MB)	Grow
sda	MSDOS				12,288	
	1	ext3	/	Label	64	<input checked="" type="checkbox"/>
	2	linux-swap	Mount point	Label	512	<input type="checkbox"/>
	3	lvm2	Mount point	Label	4,096	<input type="checkbox"/>

Groups (1)

Name	Physical Extent	Size (MB)
vg0		4,096
	Partition: sda/3	4,096

Volumes(2)

Name	File System	Mount Point	Size (MB)	Grow
vg0			4,096	
lv00	unformatted	Mount point	0	<input type="checkbox"/>
lv01	unformatted	Mount point	0	<input type="checkbox"/>

13. Create the logical volumes one by one, or create them all at once and then edit the respective specifications. For each logical volume to create, click on the + sign in the `Logical Volumes` section. For our example, you will need seven logical volumes.
 - `LogVolROOT ext4 / 3072`
 - `LogVolSWAP linux-swap 1024`
 - `LogVolUSR ext4 /usr 5120`
 - `LogVolVAR ext4 /var 1024`
 - `LogVolHOME ext4 /home 5120`
 - `LogVolTMP ext4 /tmp 1024`
 - `LogVolOPT ext4 /opt 1024`

14. Click Save.

Advanced Partitioning for Windows

You can set an advanced partitioning table for a Windows-based appliance template. To set advanced partitioning:

1. Click on `Partitioning` and select `Advanced Partitioning`
2. Click on the green + sign at the top.
3. You can modify the name and partitions type
4. Select the filesystem to `ntfs` and mount point, for example: `D :`.
5. Enter the size. The install disk should be at least 14 Gb for core versions and 20Gb for full versions
6. Check the box in the `Grow` column if you want the partition to be growable.
7. Click save.

The screenshot shows the 'Stack' tab in the UForge AppCenter configuration interface. On the left, a sidebar contains links for 'Configuration', 'Projects', 'My Software', 'OS Profile', 'Install Profile', 'Activation Key', 'Network', 'Partitioning' (highlighted), 'Time Zone', and 'Welcome Message'. Under 'Partitioning', 'Basic partitioning' and 'Advanced partitioning' are listed, with 'Advanced partitioning' selected. The main area displays 'Advanced partitioning' for 'Disks (2)'. It shows a table with columns: Name, Partition, File System, Mount Point, Label, Size (MB), and Grow. The table lists two partitions: 'sda' (MSDOS, 32,768 MB) and 'sdb' (MSDOS, 32,768 MB). The 'sda' partition is expanded to show two sub-partitions: '1' (ntfs, reserved, 100 MB) and '2' (ntfs, C:, 32,668 MB). The 'Grow' column has checkboxes, with the checkbox for partition '2' being checked. A 'save' button with a checkmark is in the top right corner.

Name	Partition	File System	Mount Point	Label	Size (MB)	Grow
sda	MSDOS				32,768	
	1	ntfs	reserved	Label	100	<input type="checkbox"/>
	2	ntfs	C:	Label	32,668	<input checked="" type="checkbox"/>
sdb	MSDOS				32,768	

Managing Configuration

When you create your appliance, you can include boot scripts to configure the appliance after provisioning or to configure the appliance to communicate with a DevOps platform for further communication steps.

Adding a Boot Script

You can add boot scripts that will be run either the first time the appliance is booted or every time the machine or virtual machine is started. The boot scripts will be run once all the software and appliance packages are installed, prior to launching the machine. The scripts are run in numeric then alphabetical order. The boot scripts will be executed as root.

Note: The firstboots are run before everyboot scripts. Bootscripts named `1_script` will be run before `a_script`, which will be run before `script_1`, which is run before `script_a`.

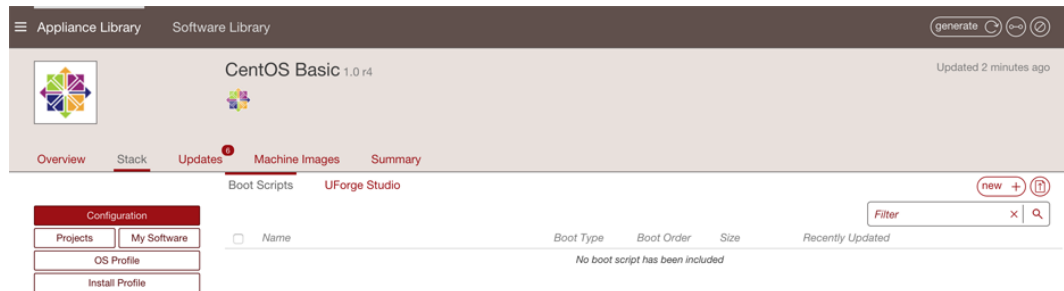
Warning: Only `.bat` files will be executed for Windows. If you want to upload a Powershell script then you should upload it to `My Software` and call the execution of the Powershell script from a `.bat` configuration bootscript.

If you want to install software or packages as part of the installation, you can use `My Software` to upload overlay files (e.g. `/etc/profile.d/xxx.sh`). For more information, refer to [Adding Software from Your Software Library](#).

To add a boot script to your appliance:

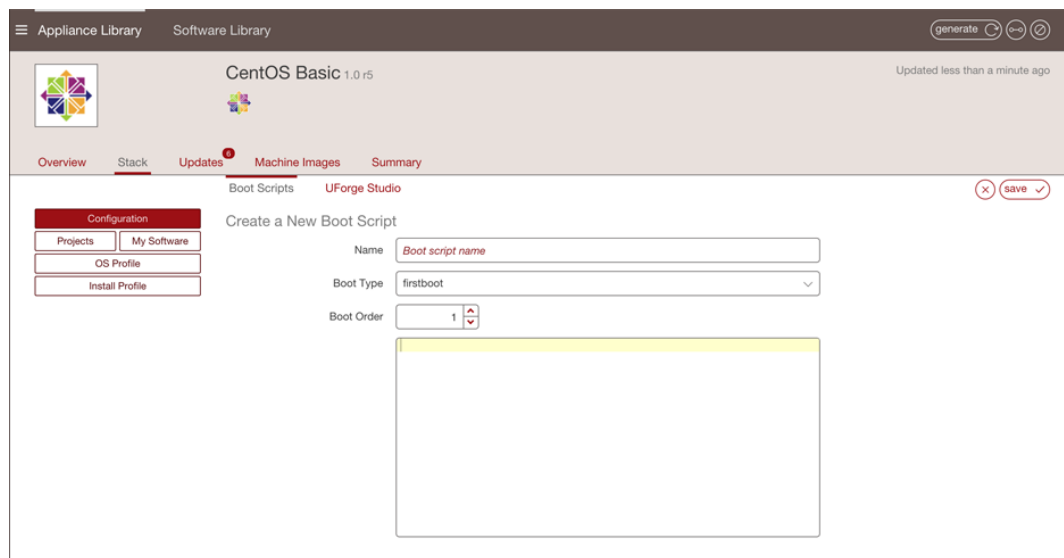
1. Select the appliance you want to modify.

2. From the `Stack` page, click on `Configuration` in the toolbox.
3. Select `Boot Scripts`.
4. Click on `new` or `upload` button on the right hand side.



If you are creating a new boot script:

1. Enter the name.
2. Select the type: If you select `first boot`, then the boot script will be launched once the first time the instance is launched. If you select `every boot`, then the boot script will be launched every time the instance is rebooted.
3. Select the boot order.
4. Enter the contents of the boot script.
5. Click `save`.



If you are uploading an existing boot script:

1. Select the type: If you select `first boot`, then the boot script will be launched once on the first time the instance is launched. If you select `every boot`, then the boot script will be launched every time the instance is rebooted.
2. Select the boot order.
3. Click `choose` to locate your file and click `open`.
4. Click `save`.

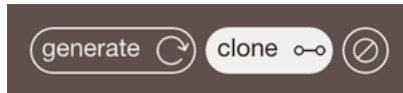
Cloning an Appliance Template

Once you have created an appliance, you can clone it. This clones all the meta-data of the original appliance template.

Note: Your clone will not include any machine image information that was generated or published for the original.

You can clone an appliance template as follows:

1. Select the appliance you want to clone.
2. Click `clone` in the top right hand toolbar.



3. Enter the appliance name and version of the clone.
4. Click `clone`.

Importing and Exporting Templates

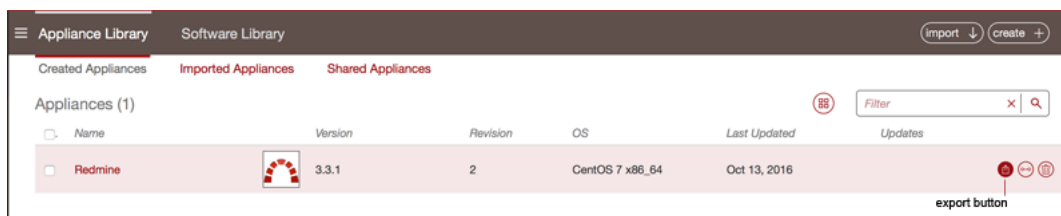
You can import and export appliance templates. When exporting, an archive is created of the appliance template. This archive includes a meta-data file describing the appliance template (based on the [hammr](#) specification) as well as any bundled software that was initially uploaded as part of the template creation.

Likewise, an archive can be imported to the UForge platform, creating a new appliance template in your Appliance Library under the Imported Appliances section.

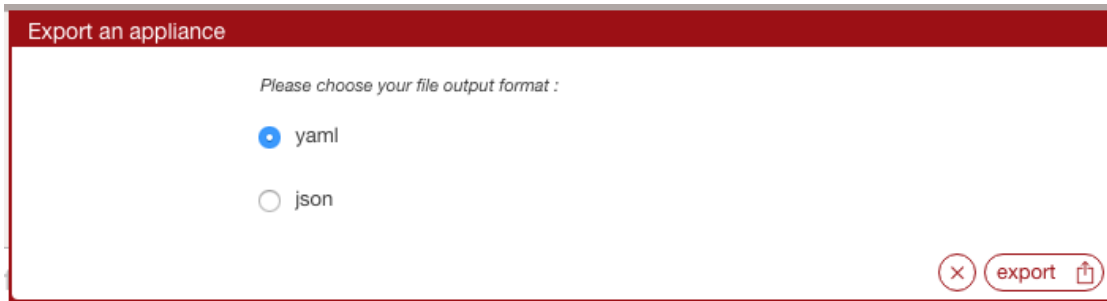
Exporting

To export an existing appliance:

1. Go to your `Appliance Library`.
2. Click on the `export` icon on the right hand side of the appliance template in question to export.



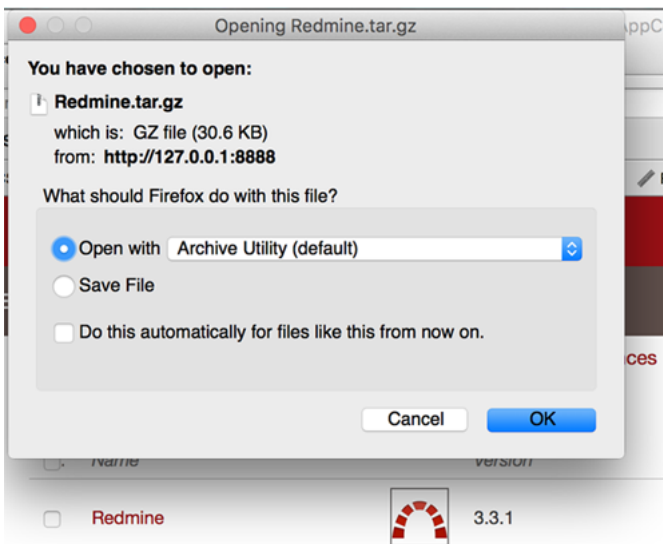
3. A pop-up will appear, allowing you to select the format you would like (yaml or json).



4. Click export. This will start the export process.



5. Once the export is complete, you will be prompted to download the archive file.



The equivalent export feature is available when editing an appliance template.

Importing

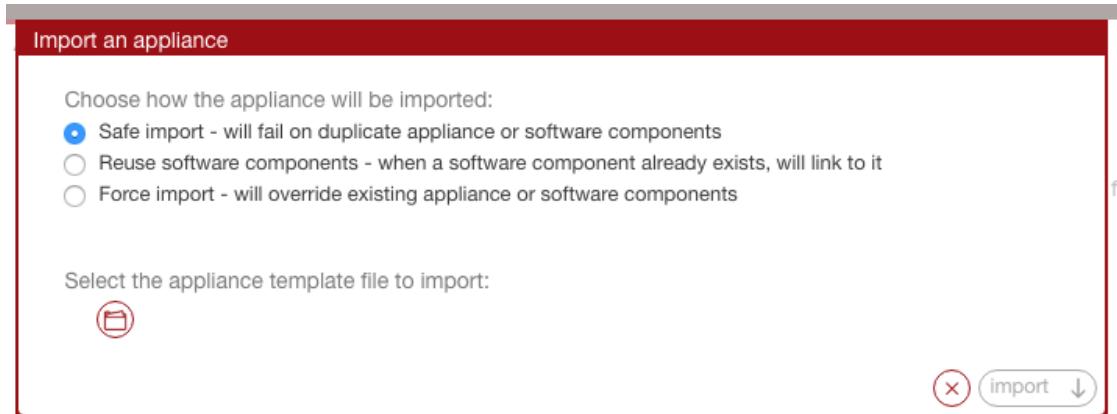
Warning: You will only be able to import a Windows appliance to a UForge that has the same golden image as the one used by the appliance. If the golden does not exist on the target UForge you must export the appliance without OS Profile or remove some OS section fields in template file. Refer to [Updating a Windows Appliance Before Import](#).

To import an archive:

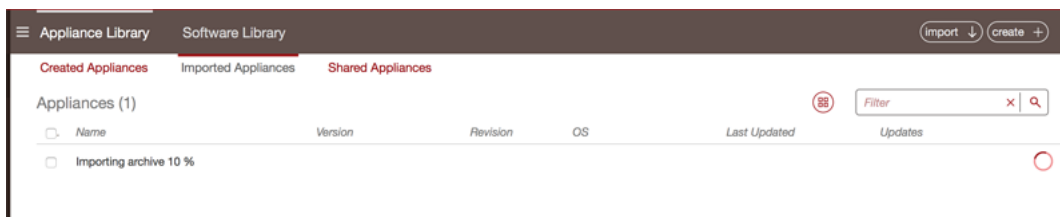
1. Go to your `Appliance Library`.
2. Click on the `import` button at the top right hand side of the view.



3. A number of options are proposed. Select the method of import and click the folder icon to select the archive to import.



4. Click import. This will start the import process. The import progress will be shown.



5. Once the import is complete, a new appliance template can be found in the Imported Appliances sub-section of your Appliance Library.

Updating a Windows Appliance Before Import

When you import a Windows appliance, UForge checks if the golden image used to create the appliance exists on the UForge. If it does not exist, the import will fail. In order to import the template, you must export the appliance and remove the OS profile.

For example, in order to remove some OS section fields before importing your Windows appliance:

1. Go to your Appliance Library.
2. Click on the export icon on the right hand side of the appliance template to export.
3. Once the export is complete, you will be prompted to download the archive file.
4. Open the archive file. The OS section should look something like:

```
os:
  name: "Windows"
  version: "Server2012R2"
  arch: "x86_64"
  profile: "Win2K12R2 scan Scan #1"
  windowsEdition: "standard"
  windowsType: "full"
  windowsLanguage: "English"
```

5. Update the OS section to remove the lines `profile`, `windowsEdition`, `windowsType`, `windowsLanguage`. For example:

```
os:
  name: "Windows"
  version: "Server2012R2"
  arch: "x86_64"
```

6. Save the file.
7. Go to your `Appliance Library`.
8. Click on the `import` button at the top right hand side of the view.
9. A number of options are proposed. Select the method of import and click the folder icon to select the archive to import.
10. Click `import`. This will start the import process.

You can also remove the OS Profile from the UI by going to the `Stack` page of the appliance before exporting.

Migrating Live Workloads

UForge AppCenter offers the capability to migrate a live system. UForge Migration will “deep scan” a live system and report back the meta-data of every file and package that makes up the running workload. It also allows you to change or add individual components prior to the final migration.

The following sub-sections describe in detail the scan steps and the differences between black box and white box migration:

Migration Process Overview

To migrate a live workload to a new target environment, you first copy the `uforge-scan` binary to the target environment and launch the binary. This binary analyzes the live system and sends back a report. You can select two types of scan: scan or scan with overlay. A scan will scan the target environment, but will only return the system packages and configuration known to UForge. A scan with overlay will include an overlay report which details all the extra files, packages or specific configuration.

Note: Scan with overlay is only supported for Linux-based machines.

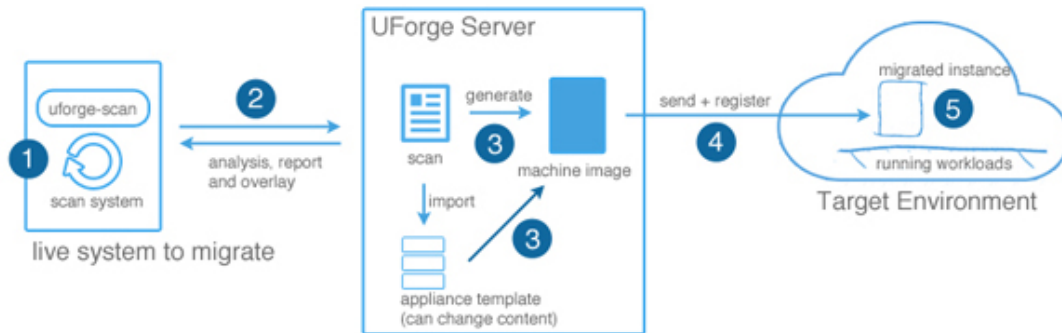
From the scan, you can then generate a new machine image that is compatible for the target environment. Once a machine image has been generated, the machine image can then be registered to the cloud environment and used to provision an instance. This instance will contain the same packages and files as the original running environment. This is known as “black box” migration.

You can transform a scan to an appliance template. By doing this, you have the opportunity to change the packages, files or configuration information prior to generating and registering a machine image. This is known as “white box” migration.

The five main steps of migration are as follows:

1. The live system is “deep scanned”, detecting all the files and configuration information.
2. The scan report and overlay is sent to UForge AppCenter.

3. A machine image is generated from the scan (black box migration). You can also import the scan prior to machine image generation to change the content (white box migration).
4. The machine image is uploaded and registered to the target environment.
5. The registered machine image (also known as a template in cloud terminology) can be used to provision one or more instances. These instances have near identical content to the original live system.



Blackbox Migration Process

The goal of black box migration is to reproduce a near identical copy of the currently running workload. However, there will always be small differences between the two workloads after migration is complete, notably some services are disabled or enabled depending on the target machine image being created (refer to [Changes to Service State Based on Target](#)). When scanning a system the following information is detected:

- all the files and packages on the system (including configuration information). If you have selected a scan without overlay, then extra files and specific configuration information will be detected but will not be included in the report.
- network settings including all NICs. Note that if the first card is static, it will be changed to DHCP.
- root and user password (encrypted)
- timezone
- keyboard settings
- kernel parameters
- users and groups
- SSH keys
- filesystem layout (partitioning)
- SELinux settings (for Linux only). When SELinux is detected on the migrated system, the `/.autorelabel` file is added to the file system in order to relabel it on first boot.

When you generate a machine image from the scan, all the information included in the scan report is used in constructing the new machine image (except extra files if you performed a scan without overlay). However, prior to the generation starting, you will be prompted to indicate if you want to change some basic settings of the filesystem, namely the overall disk size and the swap size. You cannot set the swap size to 0. If you want to delete the swap partition, you must do this in `Advanced Partitioning` (refer to [Configuring Advanced Partitioning](#)).

Warning: If the IP address of the live system being scanned has a static IP address, then this IP address is preserved, except when migrating a K5 image. For K5 migration, the settings will be changed so that DHCP is used. In all other cases, when the machine is migrated, the new instance has the same IP address as the original machine. In the case where the machine being scanned uses DHCP, then DHCP will be used for the migrated instance also. In this case the target environment must provide a DHCP service for an IP address to be assigned. If you wish to migrate a workload that has a static IP address, and you wish to reset the IP address or use DHCP then you should use white box migration.

Warning: Currently, UForge is not able to migrate the Yum repository GPG keys. This means that the user will have to accept the repository GPG key when the user installs or updates a package. The user will have to do this only once per repository.

Note: If you plan to migrate a Windows instance onto [K5 Fujitsu Public Cloud](#), you must also do the following before scanning:

1. Uninstall VMWare Tools (if installed).
2. Disable NLA for RDP (Please refer to official Microsoft documentation [Configure Network Level Authentication for Remote Desktop Services Connections](#)).
3. Uninstall CloudBase-Init (if installed).

For more detailed information, please refer to [official Fujitsu K5 IaaS Documentation](#).

When you carry out black box migration (by generating a machine image directly from a scan), the following steps are carried out:

1. You are prompted to indicate if you want to change the overall disk size.
2. Choose the machine image format to generate. Further options are provided depending upon the format chosen.
3. UForge AppCenter generates the machine image:
 - Dependency checking is SKIPPED. This is done intentionally so that UForge does not alter the package list manifest detected during the scan process.
 - Create the disk ready for installation (using the disk size and partitioning by the user if they have requested a change)
 - Install the native os packages from the scan report
 - Apply the overlay file from the scan report, if you performed a scan with overlay
 - Apply the low configuration information detected in the scan report (passwords, timezone, keyboard, etc)
 - Apply any specific libraries or configuration depending on the machine image format chosen (e.g for AWS UForge adds the required AWS libraries)
4. Register the new machine image to the target environment.
5. You can provision one or more instances from the machine image. Each instance being a near identical workload from the original.

Whitebox Migration Process

The goal of white box migration is to change the contents found during the scan of the live system prior to migration. To carry out a white box migration, the user must import the scan report as an appliance template. The import process basically transforms the meta-data of the scan report to an appliance template.

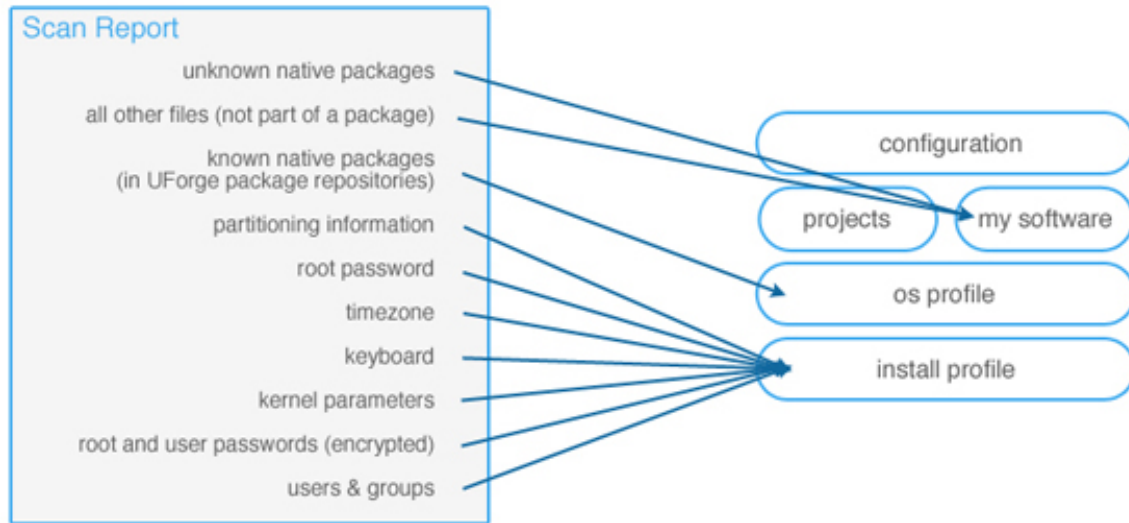
As part of this transformation process, the scan information is mapped to one or more of the appliance template layers as follows:

- Native packages that have been analyzed by the scan process and correctly found in one of UForge AppCenter package repositories are added to the `OS Profile`.
- Native packages that have been analyzed by the scan process and NOT found in any of UForge AppCenter's package repositories are added to a `My Software` component.
- All other files (including configuration files) that are not part of a native package are added to a `My Software` component if you performed a scan with overlay.
- Partitioning table information is added to the `Install Profile`
- Root and user passwords are added to the `Install Profile` (encrypted)
- Timezone is added to the `Install Profile`
- Keyboard is added to the `Install Profile`
- Kernel parameters are added to the `Install Profile`
- Users and groups are added to the `Install Profile`
- **SELinux settings are added to the `Install Profile` for CentOS, Red Hat and Scientific Linux only. Note the following**
 - if SELinux is not activated on the scanned machine, it will still not be activated on a VM generated from this scan.
 - if SELinux is activated, it will be activated with the same rules, and the file system will be relabeled on the first boot because of “`/etc/selinux/config`” file (and this file is deleted by SELinux once the relabel is done). Parameters from the `/etc/selinux/config` file other than the SELinux mode are lost during the appliance import. If you want to modify some of these parameters you will need to add a `MySoftware` overlay with a `/etc/selinux/config` file after the scan. Refer to [Adding Software from Your Software Library](#).

Warning: All other information found in the scan is not used (reset) and the `Install Profile` default information is used. This includes:

- Networking information (IP address). Furthermore, appliance templates do not support multiple NICs, therefore only the first NIC is taken into consideration.
- SSH keys. You will need to manually add the ssh keys to the install profile.

Warning: Currently, UForge is not able to migrate the Yum repository GPG keys. This means that the user will have to accept the repository GPG key when the user installs or updates a package. The user will have to do this only once per repository.



Once the scan report has been imported as an appliance template, you can update the content prior to generating a machine image.

The generation process is slightly different between black box and white box migration. UForge is not generating a machine image from a scan report, rather from an appliance template. You can add and remove packages at will from the OS Profile layer. Consequently package dependencies are calculated using the list of packages in the OS Profile. Any missing packages from the OS Profile are added prior to generating the machine image.

Migration Process In Detail

The entire migration process has 5 main steps. These are:

1. Scan the source machine.
2. Report the scan results to UForge AppCenter, where the platform analyzes the report. The scan differentiates between known packages and extra files.
3. The results are used to build an archive. The extra files are only included in the archive if the user is performing a scan with overlay. The archive is sent back to the platform.
4. The archive is uncompressed, and the information is stored in the database as a `Scan`.
5. The scan can be used to generate machine images (black box migration) or imported to create a new appliance template (white box migration). The generated machine image can then be published to the target environment and instances can be provisioned.

In order to migrate a system, it must meet the following conditions:

- The operating system must be in one of the supported formats (refer to [Supported Operating Systems](#)).

Note: Your scan will take longer if not all minor versions of a distribution are installed in your UForge AppCenter. For example, if you scan a CentOS 6.8 machine, but your AppCenter has only been populated with packages up to CentOS 6.7, then the AppCenter will use the machine's yum repo to download the missing packages. As a result, the scan will take longer before completing.

- The image formats must be in supported formats (refer to [Supported Machine Image Types](#))

- For Windows, the partition format must be NTFS
- For Windows, GPT is not supported. Scanned Windows machine has to have MBR.

Scanning the Source Machine

On the scan target, the `uforge-scan` binary is copied and launched as root to analyze the entire system. The scan carries out the following phases:

1. `uforge-scan` tests the connection to UForge server with the information provided by the user in the command line.
2. `uforge-scan` checks the basic information of the machine (Operating System, architecture) and the installation parameters (partitioning, timezone, keyboard, etc.).
3. Analysis of the operating system native packages installed on the system. The `uforge-scan` binary checks which packages have been installed, the state of the files in these packages etc. The scan process registers all the metadata (rights, user and groups, checksums).
4. Analysis of the files that are not part of any operating system native packages.

Analysis of Report

A report is created by the `uforge-scan` binary based on all the information discovered. This report is transferred via HTTPS to UForge AppCenter.

Note: The extra files are only included in the archive if the user is performing a scan with overlay.

UForge AppCenter stores all the report information. This data is then processed to identify what information is missing by UForge AppCenter to rebuild the source machine. The processing includes:

- which operating system native packages UForge AppCenter does not have in its repository or in an incremental scan.
- which files from operating system native packages have been modified compared to the official native packages in the UForge AppCenter repositories.
- which files that are not part of any OS native packages and are not in any incremental scan of the same machine.

The results of this analysis are then sent via HTTPS back to the `uforge-scan` binary on the source machine. This is basically all the information that UForge AppCenter does not have already based on the initial report received.

Build the Overlay Archive

The `uforge-scan` binary retrieves the analysis results from UForge AppCenter. These results include a list of all the packages and files UForge requires. The `uforge-scan` binary builds an overlay archive of all these packages, as well as the extra files if the user has performed a scan with overlay.

The overlay is all the things that are missing compared to a known state (a previous scan of a machine or the operating system native packages). This overlay is a standard tar archive. Once created, it is uploaded via HTTPS to the UForge AppCenter.

The overlay is not built on the scan target but it is stream uploaded (faster and does not need any space on the scan target machine).

At this stage in the process, the `uforge-scan` binary has finished its job and no further communication between the scanned machine and UForge AppCenter is required. For this reason, the `uforge-scan` binary exits.

Note: No temporary files related to overlay remain on the scan target.

Overlay Extraction

UForge AppCenter retrieves and extracts the overlay sent by the `uforge-scan` binary if the user has performed a scan with overlay. It then recreates all the necessary OS native packages that are not present in any of the package repositories known by UForge AppCenter.

The analysis and overlay processes are now finished. All the scan metadata remain in UForge AppCenter until the scan gets deleted.

You can now carry out a black box or a white box migration. For black box migration, you generate a new machine image from the scan. For white box migration, you must first import the scan as an appliance template.

Generate an Image (Black Box Migration)

At this stage, the scan report is used to generate a new machine image. The generation tool:

1. Returns all the packages discovered on the scan target and installs them.
2. Takes the overlay and applies it on top of the built system (for scan with overlay).
3. Tunes the machine for the target environment. This is specific to the machine image format chosen. This includes injecting extra libraries and packages required by the target environment.
4. The networking information is treated differently depending on whether the IP address of the workload being migrated is using a static IP address or DHCP.
 - Static IP Addresses: The current information detected during the scan is kept. During the generation phase, this networking information is also kept. Consequently, the new machine instance has the same static IP address set.
 - Dynamic (DHCP) IP addresses: In this case, the networking information, is reset namely the IP address information is removed during the generation process, and is setup as DHCP. When the new machine instance is provisioned, the instance sends a request to the local cloud DHCP service to get a new IP address.

In the case of a migration from a para-virtualized platform to a non para-virtualized platform, UForge AppCenter injects everything that is needed to make the machine work (the kernel and its tools). Based on the packages discovered on the scan target and on the underlying operating system, UForge AppCenter calculates the most accurate kernel version to inject for your machine.

Once the image is generated, it is possible to push it to a remote environment. The image is then ready to be launched in the new environment and the migration is finished.

Import to an Appliance Template (Whitebox Migration)

At this stage, the scan is used to create a new appliance template. This allows you to change and modify the contents of the machine that has been scanned.

The process of importing:

1. Creates a template.

2. Creates an `OS Profile` and injects all the native packages.
3. Injects the overlay as a `My Software` component and is added to the appliance template (for scan with overlay).
4. Sets the scanned installation configuration information in the `Install Profile`.

It is then completely detached from the scan and you can do exactly the same things as with any other template.

If you generate an image from this template, it will go through the same steps as a standard template generation:

1. Checks all the dependencies.
2. Installs all the packages.
3. Installs all the my software components.
4. Tunes the machine for the target environment. This is specific to the machine image format chosen. This includes injecting extra libraries and packages required by the target environment.

Once the image is generated, it is possible to push it to a remote environment. The image is then ready to be launched in the new environment and the migration is finished.

Scanning the Source System

The first step in migrating your system is running a scan of the target system. This identifies the meta-data of every file and package that makes up the running workload.

You must have root access on the target system in order to complete the scan, as you will need to copy and run a binary file on the target system.

Warning: UForge AppCenter does not support multi-kernels. When scanning a machine with more than one kernel, only the kernel running will be scanned and imported.

When you run a scan of a system, UForge AppCenter will differentiate between “known” data (OS packages and files that are already part of UForge AppCenter repository) and files that are “unknown”.

Warning: Any pre-install or post-install scripts on the system you are about to scan should only use ascii character set. Otherwise UForge AppCenter will return a scan error: `DB Error - invalid characters`.

Recommendations pre-scan:

- Pre-install or post-install scripts on the system you are about to scan should only use ascii character set
- Custom packages on the live system to be scanned should not contain references to package dependencies as relative path. They should be expressed as absolute paths.
- If custom packages are installed using `--nodeps` flag, the scan process will not detect these packages. When carrying out white box migration, UForge AppCenter will check for these dependencies. If they are custom packages that are not on the live system, the generation will fail. Therefore, it is recommended to provide a custom repository with all the necessary custom packages. Otherwise, they can be added after the scan to the appliance template in `My software`.

Scanning a Linux Machine

Warning: When scanning a Linux machine, you have to check whether the licenses of OS and software which the source machine contains allow you to use them on the destination server which you are migrating to. For more detail, refer to *Notes on Licensing*.

To carry out a scan, go to the Migration tab:

1. Click on `scan` in the top right.
2. Enter a name for the scan of the target system you want to migrate.

3. Select `Linux` from the drop-down menu.
4. Leave `Include overlay` selected if you want to run a scan with overlay. This will return all the packages, files and configuration information of the source machine.
5. If you want to exclude certain directories or files from the scan then click `add` and enter the directory path or full pathname of the file.
6. Click `Next`. Follow the instructions on the UForge AppCenter GUI.

7. Download binary locally by clicking `Download`.
8. Copy the binary on the target environment you want to migrate.
9. Open a terminal window and login to the target environment.
10. Run the scan command on the running target environment to start a scan of the system you want to migrate. Note the `-o` option in the scan command identifies that you will launch a scan with overlay. The binary identifies the packages, files and custom files on the system.

By default the scan data will be saved in `/tmp`. You can modify the directory where the data will be saved using the `-t` option in order to ensure that there is enough space to save the scan data.

You can also use API keys to run the command. In this case, in the command you copied, remove the password and enter the API keys using `-a` option for the public key and `-s` option for the secret key. For example:

```
./uforge-scan.[bin/exe] -u <username> -a <public-key> -s <secret-key> -U http://ip:port/ufws -n 'Test_scan'
```

11. A report is sent to UForge AppCenter which can be used for migration. To view the progress, go back to the `Migration` tab and click `ok`.

Note: The duration of the scan depends on:

- the power of the machine in the target environment,
- the complexity of the target environment OS (number of packages installed),
- the network bandwidth between the target environment and UForge.

Scans of typical simple target environments can last about 5 to 15 minutes. In the case of larger and more complex target environments, together with poorer bandwidth, one can experience durations of up to one hour.

12. To view the details of a scan, click on the scan and refer to [Viewing a Scan](#).

Note: Image generation will fail when migrating if the source server has the same LVM volume group name as the UForge server's one. It will fail also if the volume group name set in the Partitioning Table is the same as the name of LVM volume group in UForge server.

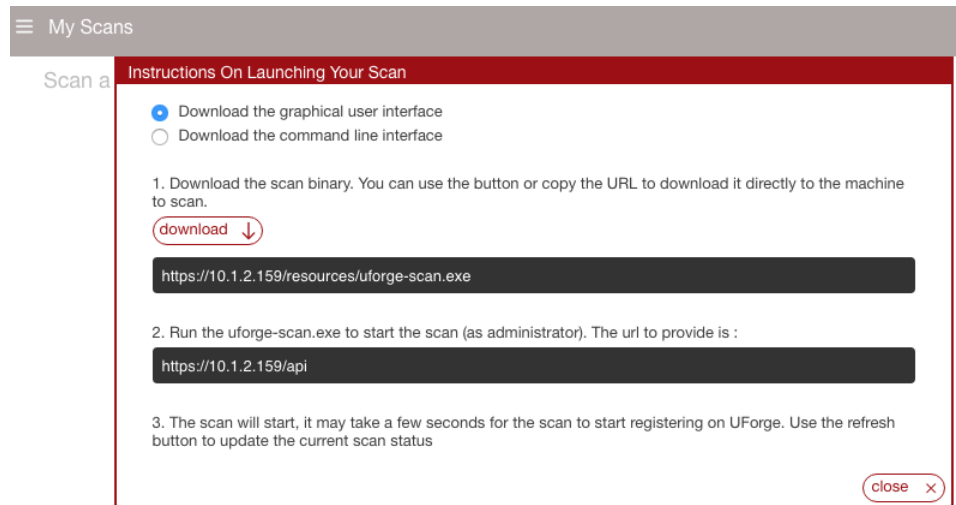
Scanning a Microsoft Windows Machine

Warning: When scanning a Microsoft Windows machine, you must acquire Windows licenses in order to handle Windows OS in UForge and confirm usage conditions of cloud provider and virtualization software which you scan and migrate to.

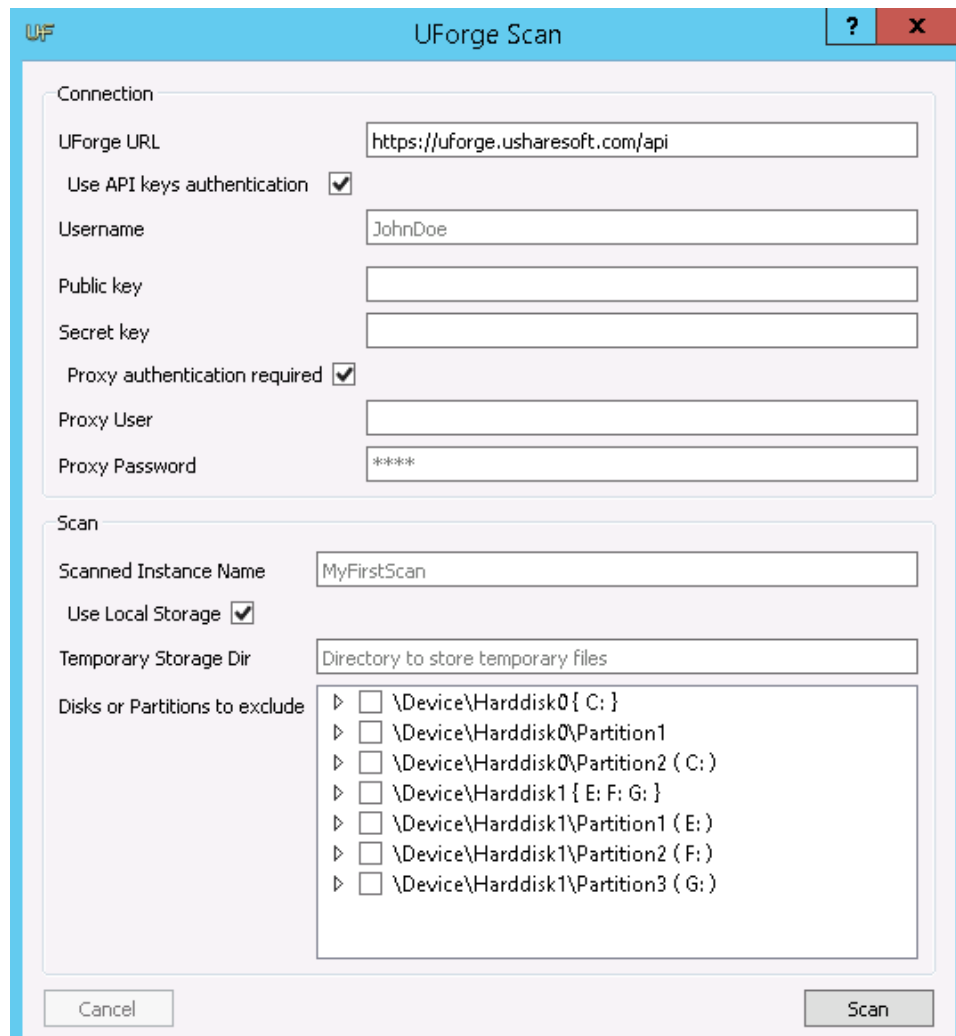
Note: It is not possible to scan a Windows “Core” system for all versions: 2008R2, 2012, 2012R2 and 2016.

To carry out a scan, go to the `Migration` tab:

1. Click on `scan` in the top right.
2. Enter a name for the scan of the target system you want to migrate.
3. Select `Windows` from the drop-down menu and click next.
4. Select if you want to use the graphical user interface or the command line. Follow the instructions on the pop-up to download the scan binary.



5. You can then launch the scan. The following image illustrates a windows scan with all of the possible options checked. They are described in the following steps.



6. Optionally you can use API keys. In this case, check Use API keys authentication and

enter the public and secret key information.

7. If you want to set up a proxy, check `Proxy authentication required` and enter the proxy information.
8. Optionally you can select `Use local storage`. This means that the scan will be not be done in streaming but in 2 phases. First the data will be stored on a temporary storage drive during the scan process. This temporary storage can be a local directory or a virtual space on the network. It must be at least half the size of the machine you want to scan.

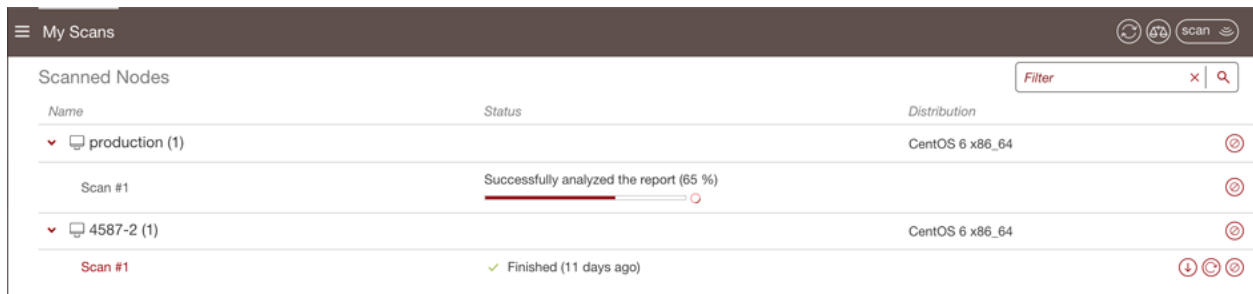
Note: If you are using local storage you will have to launch a script at the end to upload the archive to UForge AppCenter later.

9. If you want to exclude certain directories or files from the scan then click `add` and enter the directory path or full pathname of the file.
10. Click `scan` to launch the scan. A report is sent to UForge AppCenter which can be used for migration. To view the progress, go back to the `Migration` tab and click `ok`.
11. To view the details of a scan, click on the scan and refer to [Viewing a Scan](#).

Viewing a Scan

Once you have run a scan, you can view the scan details.

To view the scans, go to the `Migration` tab > `My Scans`. All the scans are listed by name. If you have run the same scan with the same name, it will appear as `Scan <number>`.



My Scans			Filter
Name	Status	Distribution	
production (1)		CentOS 6 x86_64	
Scan #1	Successfully analyzed the report (65 %)		
4587-2 (1)		CentOS 6 x86_64	
Scan #1	Finished (11 days ago)		

From this page you can:

Viewing the Details of Scan

You can view the details of the scan report that will display the packages that are present as well as the filesystem detected on the scanned source instance. The information available depends on whether the scanned instance is Linux-based or Windows-based.

Linux-based

To view the details of a scanned Linux-based instance:

1. Go to the `Migration` tab and click `My Scans`.

- Click on the scan. All of the packages and non-native files will be listed.

The screenshot shows the 'My Scans' interface in UForge AppCenter. At the top, there's a header bar with 'My Scans' and navigation icons. Below it, the 'Scan' tab is selected, showing details for '4587-2 Scan #1'. The scan was performed on a CentOS 6 x86_64 system, is a 'Base Scan', and was taken 11 days ago. The state is 'Successfully scanned'. It lists 197 OS Packages and 22 modified, 860 added, and 12 deleted other files.

Native Packages

Name	Version	Release	Architecture	In Repo
audit-libs	2.3.7	5.el6	x86_64	
basesystem	10.0	4.el6	noarch	✓
bash	4.1.2	33.el6	x86_64	
binutils	2.20.51.0.2	5.43.el6	x86_64	
bzip2	1.0.5	7.el6_0	x86_64	✓
bzip2-libs	1.0.5	7.el6_0	x86_64	✓
ca-certificates	2015.2.4	65.0.1.el6_6	noarch	
centos-release	6	7.el6.centos.12.3	x86_64	

☐ Only show packages with changes

Other Files

Name	Owner:Group	Permissions	Size
.autofsck	root:root	-rw-r--r--	-
.autorelabel	root:root	-rw-r--r--	-
bin	-	-	-
boot	-	-	-
etc	-	-	-
lib	-	-	-
lib64	-	-	-
lost+found	root:root	drwx-----	-

- You can also filter the packages that have been modified (UForge AppCenter compares the packages scanned with its repo) by checking **Only show the packages with changes**.
- To view the more details of a package, click on the package name and then the arrow.

Note: The number of packages between your scanned system and the one in UForge AppCenter will differ for several reasons. First, if you had more than 1 kernel only 1 is imported into UForge AppCenter. Also, UForge AppCenter adds files for install configuration and install profile.

Windows-based

Note: The details of the scan are for information purposes only. They cannot be modified.

To view the details of a scanned Windows-based instance:

- Go to the **Migration** tab and click **My Scans**.
- Click on the scan.
- To view the Windows applications, go to the **Applications** tab.

WS2016 Scan #1

Distrib... Windows Server2016 x86_64 State Successfully scanned OS Type Full
 Scan T... Base Scan OS Ed... Standard OS La... English
 Scan T... 6 days ago

Applications **Services** Imports Golden Images

Name	Version	Path	Size	Architecture	Windows store
Microsoft Visual C++ 2008 Redistrib...	9.0.30729.6...		1 MB	x64	
Microsoft Visual C++ 2008 Redistrib...	9.0.30729.4...		872 KB	x86	
Microsoft.AAD.BrokerPlugin	1000.14393...		N/A	neutral	✓
Microsoft.AccountsControl	10.0.14393...		N/A	neutral	✓
Microsoft.BioEnrollment	10.0.14393.0		N/A	neutral	✓
Microsoft.LockApp	10.0.14393.0		N/A	neutral	✓
Microsoft.Windows.Apprep.ChxApp	1000.14393...		N/A	neutral	✓
Microsoft.Windows.AssignedAccess...	1000.14393...		N/A	neutral	✓

4. To view the Windows services, go to the **Services** tab.

WS2016 Scan #1

Distrib... Windows Server2016 x86_64 State Successfully scanned OS Type Full
 Scan T... Base Scan OS Ed... Standard OS La... English
 Scan T... 6 days ago

Applications **Services** Imports Golden Images

Name	Startup Type	Description
ActiveX Installer (AxInstSV)	Manual	Provides User Account Control validation for the installation of ActiveX controls from the Internet and enables m...
AllJoyn Router Service	Manual	Routes AllJoyn messages for the local AllJoyn clients. If this service is stopped the AllJoyn clients that do not ha...
App Readiness	Manual	Gets apps ready for use the first time a user signs in to this PC and when adding new apps.
Application Identity	Manual	Determines and verifies the identity of an application. Disabling this service will prevent AppLocker from being e...
Application Information	Manual	Facilitates the running of interactive applications with additional administrative privileges. If this service is stoppe...
Application Layer Gateway Service	Manual	Provides support for 3rd party protocol plug-ins for Internet Connection Sharing
Application Management	Manual	Processes installation, removal, and enumeration requests for software deployed through Group Policy. If the se...
AppX Deployment Service (AppXSVC)	Manual	Provides infrastructure support for deploying Store applications. This service is started on demand and if disable...
Auto Time Zone Updater	Disabled	Automatically sets the system time zone.

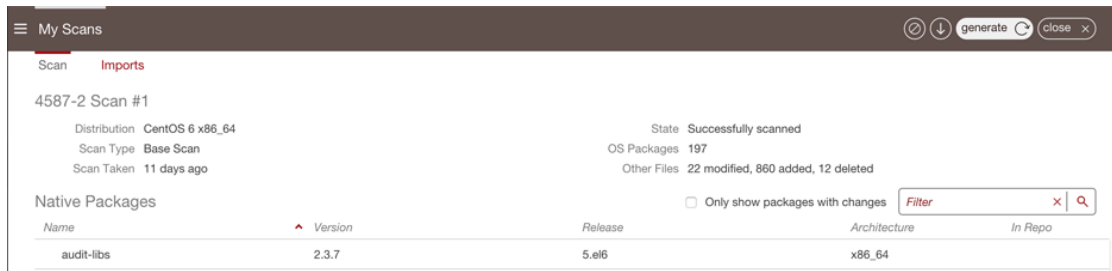
Generate a Machine Image

Once you have scanned a source system, you can generate a machine image directly from the scan report.

Note: When generating a machine image, some services are disabled or enabled depending on the target machine image being created (refer to *Changes to Service State Based on Target*).

To create an image from a scan:

1. Go to the **Migration** tab.
2. Double click on the scan to view details.
3. Click on the **generate** icon in the top right.



4. Select the image format you want.
5. Click Generate.

Create an Appliance from a Scan

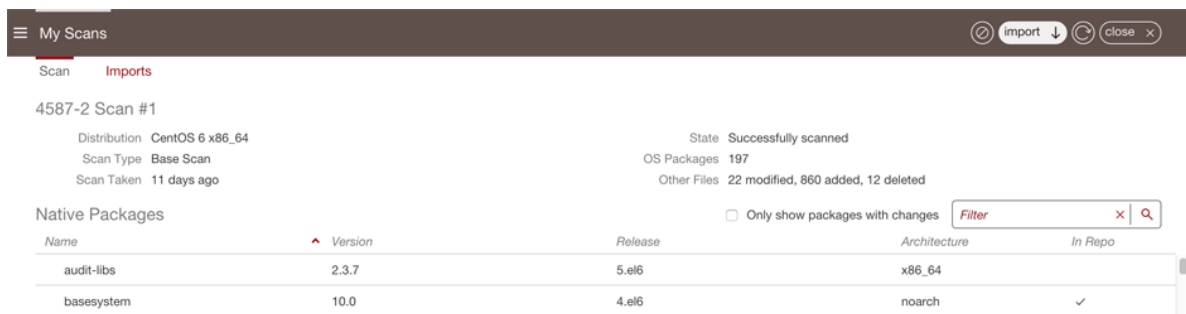
You can create an appliance template from a scan. Once you create an appliance template packages and files that are known will be listed under OS profile, while “unknown” packages and files will be listed under MySoftware.

To create an appliance template from a scan:

From the Migration tab:

1. Go to My Scans.
2. Select the import button (downward arrow) to create an appliance template from the scan. The following example is for Linux, but you can also import a Windows scan.

Note: If you have administrator rights, for a Windows scan you can choose to import as appliance or import scan as a golden image. For more information, refer to the Admin guide.



3. Enter the appliance name and version.
4. Click import.

You can now generate a machine image and share it, as you would any other appliance template.

Note: When you create a Windows appliance from scan, the applications and services will be visible under OS Profile on the Stack page.

Name	Version	Path	Size	Architecture	Windows store
Microsoft Visu...	9.0.30729.6161		1 MB	x64	
Microsoft Visu...	9.0.30729.4148		872 KB	x86	
Microsoft.AAD...	1000.14393.0.0		N/A	neutral	✓
Microsoft.Acc...	10.0.14393.1198		N/A	neutral	✓
Microsoft.BioE...	10.0.14393.0		N/A	neutral	✓

More importantly you can now change the contents of the original scanned system. If you go to the Apps tab, the new appliance template will be listed in the Imported Appliances section. Double-click on it to view the details or modify it.

Warning: Once you have created a Windows appliance using `import` from a scan, you will only be able to import this appliance to another UForge platform by removing some OS section fields. Refer to [Updating a Windows Appliance Before Import](#).

Changing a Configuration with “No-Console” Features

This is typically the case when migrating to Azure. Azure does not have any console facility today during first boot of the instance. When you migrate a workload in black box, no install type questions are asked on first boot. This is due to:

- root password is copied
- SSH keys are copied
- partitioning table is preserved
- keyboard is preserved
- timezone is preserved

Access to the machine would typically be done via SSH.

White box migration provides more flexibility. As soon as you import a scan, which effectively creates an appliance template, you will have access to the Install Profile. This allows you to reset and change many of the “installation”/first boot parameters including prompting the end user to provide the information (for example: ask the end user to set the root password). Any prompt to the end user is normally displayed in the console. However if the user logs into the machine for the first time via SSH, these prompts are displayed in the SSH terminal and not the console.

Warning: If you decide to prompt the user for the root password, then an SSH key mechanism must already be determined (private key owned by the user and public key set in the Install Profile). Otherwise the user will be locked out of the system with no way to SSH into the machine as no password has been set yet.

Changing Configuration Information

If you want to modify configuration information of a scanned system, there are several solutions:

1. Using pre-install and post-install scripts
2. Using boot scripts
3. Integrate with a Configuration Management platform

In each case, you must import the scan as an appliance template (white box migration).

Solution #1: Using pre-install and post-install scripts in the package mechanism: RPM and DEB package mechanism allows you to register scripts that are executed at various moments during the installation of the package. By packaging your middleware or application binaries as a native package you can register such scripts. These scripts are automatically taken into account as part of the machine image generation process. These packages can be added into the appliance template – either in a custom repository known by UForge AppCenter (in this case the packages are displayed as part of the repository and are added in OS Profile) or as part of a Project or My Software component.

Solution #2: Using boot scripts. UForge AppCenter allows you to add boot scripts in the appliance template. These boot scripts are executed the first time the migrated instance is provisioned. Boot scripts can also be registered to be run every time the instance is rebooted.

Solution #3: Integrate with a Configuration Management platform: There are many 3rd party platforms including Puppet, Chef, Ansible and Saltstack that can be used to configure middleware and application layers. Once a system has been migrated or a machine image generated from an appliance template, such configuration management platforms can be used for package update and configuration. You may need to include a bootstrapping mechanism to register the instance to the configuration management platform of your choice. This bootstrapping can be done using boot scripts (see solution #2).

Adding Security Patches

When a scan is imported as an appliance template all the native packages detected from the scan are compared with the UForge AppCenter package repositories. UForge AppCenter will immediately inform you whether new package versions are available for your scan report. Using the “appliance update” feature, a graph is displayed showing you all the available updates and allows the user to update the appliance template to the latest available packages. Once the appliance template has been updated, the user can then generate the machine image and register the machine image on the target environment. The migrated instance will have the latest package updates.

Of course this is not the only way to update a migrated system. The administrator can update the live system using the standard operating system update mechanism. Depending on the operating system this will be yum, apt, yast etc. The administrator can run this update manually, or add a boot script in the appliance template that carries out the update during first boot.

This allows the administrator to decide to use other configuration management platforms (Puppet, Chef, Ansible, Saltstack, BMC Bladelogic to name a few) to manage such updates. For some of these configuration platforms though, you will need to add a boot script as part of the appliance template to bootstrap the running instance with the configuration management platform.

Changing the OS Version of Middleware

Native packages, middleware and application software can be changed or swapped out; and the user can use the `appliance update` mechanism to determine if any package updates are available that can be applied prior to generating and migrating the workload.

Note: Changing the operating system for example from CentOS to Ubuntu is not supported.

For a list of supported OSes for Migration, see the table in *Supported Operating Systems*.

Major OS versions, for example upgrading from CentOS 5.0 to CentOS 6.0 is not supported automatically, though as we have the complete list of operating system packages from the scan, a new appliance template can be constructed with the new operating system version.

This process can further be automated by using the command-line tool `hammr` (see hammr.io). This tool allows you to create identical machine images from a single configuration file (in JSON). The procedure would be to:

1. Scan the original system (note the scan process can be launched by `hammr` too)
2. Import the scan as an appliance template (this step can be done by `hammr`)
3. Export the appliance template using `hammr`. This will create an archive including a JSON or YAML file of all the meta-data.
4. Update manually the major version of the operating system in the JSON or YAML file.
5. Attempt to import using the new JSON or YAML file. A new appliance template will be created with the new major operating system. Note, you may need to iterate on this, if some packages listed in the JSON or YAML file are not found (due to potential package renaming).
6. Once the import is done, re-generate which would effectively migrate the system you scanned but with a major operating system upgrade.

Qualification of any middleware and application software is strongly recommended.

Modifying the Scan Overlay

Note: This section only applies if you performed a scan with overlay.

When you import a scan as an appliance template, the overlay created as part of the scan process is registered as a `My Software` component. This `My Software` component is added to the appliance template.

The `My Software` component created from the overlay contains two archives. The first includes all the native package meta-data changes (permissions, ownership changes) and data changes (due to configuration modifications through the lifetime of the live machine). The second archive includes all files that are not part of any native package.

To modify a file in this overlay, you need to download, extract, modify and re-upload it to `MySoftware` once the changes have been made.

Comparing Scans

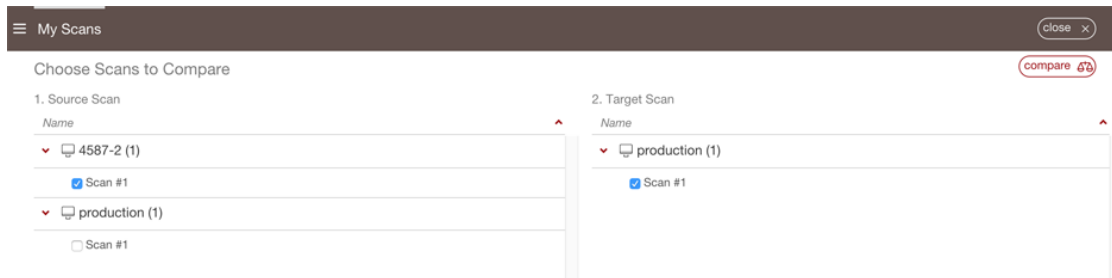
As scans are just meta-data, you can compare two scans to determine their differences. This can be used to detect the differences between two live machines (for example between staging and production) or to detect changes of the live machine over time.

Warning: This is only supported for Linux based source instances.

From the Migration tab:

1. Click on the compare button (balance icon) at the top right hand side of the My Scans page.
2. Select the source and target scan.

Warning: The source and target scan must be of the same type. For example, if the source scan is a scan with overlay, then it must be compared to a scan with overlay. Similarly, a scan without overlay can only be compared to a scan without overlay.



3. Click compare.

UForge lists all the differences between the two systems. The results show the changes you would need to make manually to get your source scan to the state of the target scan.



For example, if you have source scan A and target scan B, in the list, any items that are listed mean they are in scan B but not in scan A. Items that are in strikethrough mean that they were in your source scan A but not in scan B.

Using Workspaces

UForge AppCenter allows users to create workspaces. Only users that have been given the right to create workspaces will be able to create and manage workspaces. If this is not the case, contact your UForge Administrator.

Under the `Collaboration` tab, users can create a number of workspaces, invite other users and share appliance templates with the members of their workspace. A collaboration workspace allows you to restrict the users that can see and use your appliance templates by inviting them to join your workspace. Only users who accept the invitation will be able to view your appliances.

The following sub-sections go into detail on how to manage workspaces:

Creating a Workspace

To create a workspace:

1. Go to the `Collaboration` tab in the left-hand sidebar.
2. Click on `create workspace` in the top right hand corner.
3. Enter the workspace name.
4. Select the organization from the drop-down menu.
5. Click `create workspace`.



The screenshot shows a web interface for creating a new workspace. At the top, there is a dark header bar with a hamburger menu icon on the left and a button labeled 'create workspace' with a red 'x' icon on the right. Below the header, the main content area is titled 'Create a New Workspace'. It contains two input fields: a text field labeled 'Name' with the value 'Dev Team' and a dropdown menu labeled 'Org' with the value 'UShareSoft'.

You can now invite users, share appliance templates, and post comments in the activity stream.

The Activity Stream

Each workspace has an Activity Stream. This is a log of the current actions being carried out by the members of the workspace (for example adding a new appliance template).

Members can also add comments to the workspace for other members of the workspace to see. For example, to ask questions or share information. Your comments will be posted in chronological order in the activity stream.

To add a comment in a workspace, do the following:

1. Go to the `Collaboration` tab.
2. If you have several workspaces, select the workspace you want from the drop-down menu at the top right.
3. Enter your comment in the square.
4. Click `post`.

You can also post comments on a specific appliance that is shared in the workspace. For more information, see [Adding a Comment to a Shared Appliance Template](#).

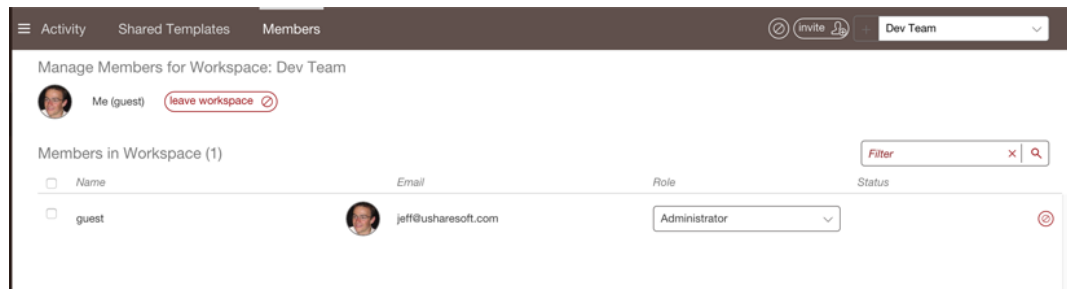
Managing Workspace Members

Inviting Members to Your Workspace

Once you have created a workspace, you can invite users to it. By inviting users, they will be able to view appliance templates you have added to the workspace, and depending upon their access rights share their appliance templates.

To invite users to your workspace:

1. Go to the `Members` page of the `Collaboration` tab.
2. Click on `invite` in the top right.



3. Enter the email addresses of the people you want to invite to your workspace. If the email you specify is not recognized by UForge AppCenter, you will be prompted to invite them to join the platform.
4. You can modify the invitation message. This message will be included in the email inviting members to join your workspace.
5. Click `invite`.

Managing Member Access Rights

Once a user has joined your workspace, you (or another workspace administrator) can modify their status. By default, when users accept your invitation and join your workspace they will be `collaborators`.

Members of a workspace are either:

- **Guest.** A guest can read and post to the activity stream, and import appliances into their private appliance library.
- **Collaborator.** The collaborator has the same basic rights as the Guest, but can also share appliances.
- **Administrator.** This is generally the user who has created the workspace. There must be at least one administrator in a workspace, though there can be more. The administrator can invite or delete members and is able to delete a workspace. The administrator has all the same basic rights as the collaborator.

Deleting a Member

If you are a workspace administrator, you can delete any member of the workspace simply by going to the `Members` page and clicking the small symbol to the right of the member's name and info.

Sharing an Appliance Template in a Workspace

The main purpose of the workspace is to share appliance templates with a group of users.

To share an appliance template:

1. Go to the `Collaboration` tab.
2. If you have several workspaces, select the workspace you want to add your appliance template to from the drop-down menu on the top right.
3. Go to the `Shared Templates` page.
4. Click on `share` in the top right. This lists your private appliance templates.
5. Select an appliance template from your list and click next arrow.
6. Add a description.
7. Click `share` to push the appliance template to the workspace.

Once an appliance template has been shared, other users in the workspace can import it into their private appliance library. They can then modify, use and share the appliance as they wish.

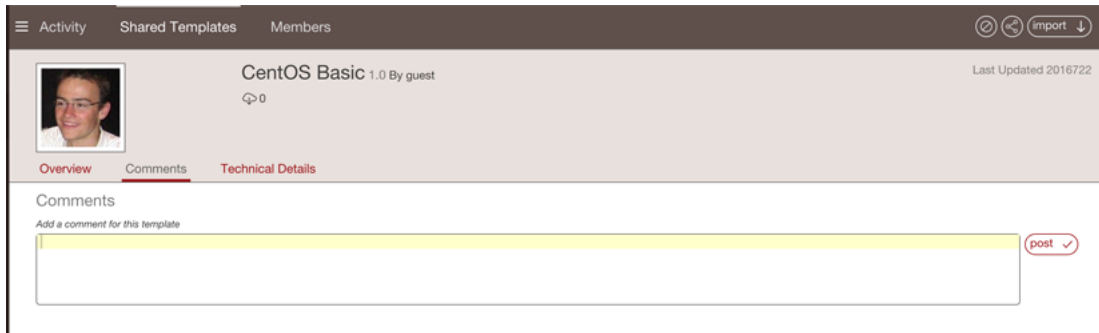
Warning: Any changes you make to your original appliance will NOT be propagated to the shared copy in the collaboration workspace. You will need to share the new version again for members of your workspace to see the changes. The older version will be overwritten.

Adding a Comment to a Shared Appliance Template

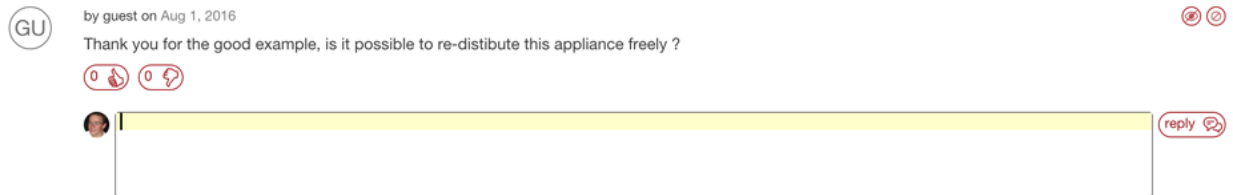
To add a comment to a specific appliance template in a workspace, do the following:

1. Go to the `Collaboration` tab.
2. If you have several workspaces, select the workspace you want from the drop-down menu on the top right.
3. Go to the `Shared Templates` page.
4. Select the appliance template you want to comment on.
5. Click on `Comments`.

6. Add your text.
7. Click post.



If you want to reply to a comment, enter your comment below the initial comment and click `reply`.



Managing Your Accounts

The `Profile` tab on the left-hand sidebar allows you to modify a large number of your personal details, including your password.

The following sub-sections go into detail on how to manage your account information:

Modifying Your User Profile

You can edit your user profile by going to the `Profile` page. The only mandatory information is your email address.

The screenshot shows a web interface for managing a user profile. At the top right is a 'save' button with a checkmark. The page is divided into three main sections: 'Account Summary', 'Address', and 'Company Information'. Each section has a corresponding icon (a circle with 'RO' for account summary, an envelope for address, and a building for company information). The 'Account Summary' section includes fields for First Name, Surname, Email, and Website. The 'Address' section includes fields for City/Town, State, Country (a dropdown menu), Home Phone, and Mobile Phone. The 'Company Information' section includes fields for Company, Job Title, Company Website, and Office Phone. All input fields have placeholder text in red.

You can add or modify your name, company information and address and click `save`.

To add a photo to your profile or modify the existing one:

1. Go to the `My Account` page.
2. Click on the `Profile` tab.
3. Click on the round photo icon on the left hand side.
4. Navigate to the desired image (preferably a .jpeg or .png).

5. Click `Open`.
6. Click `save`.

Viewing Your Statistics

Your Usage

When you log in to the UForge Portal, the first page you will see is the `Dashboard > Usage` sub tab. This view displays your statistics on the platform.

The first part of the page displays your current usage and quota information for appliance templates, software components, machine image generations and scans created.

The `Appliances` summary shows the number of appliance templates you currently have in your Appliance Library. Your quota usage and limit is displayed under the summary information. If you have reached your quota limit, you can delete existing appliance templates to free up space to create new ones. This information is not shown if you do not have access to creating and managing appliance templates.

The `Software Components` summary is the number of software components (also known as software bundles) you currently have in your Software Library. Your quota usage and limit is displayed under the summary information. If you have reached your quota limit, you can delete existing software components to free up space to create new ones. This information is not shown if you do not have access to creating and managing appliance templates (as these software components are added to appliance templates). This information is not shown if you do not have access to creating and managing appliance templates.

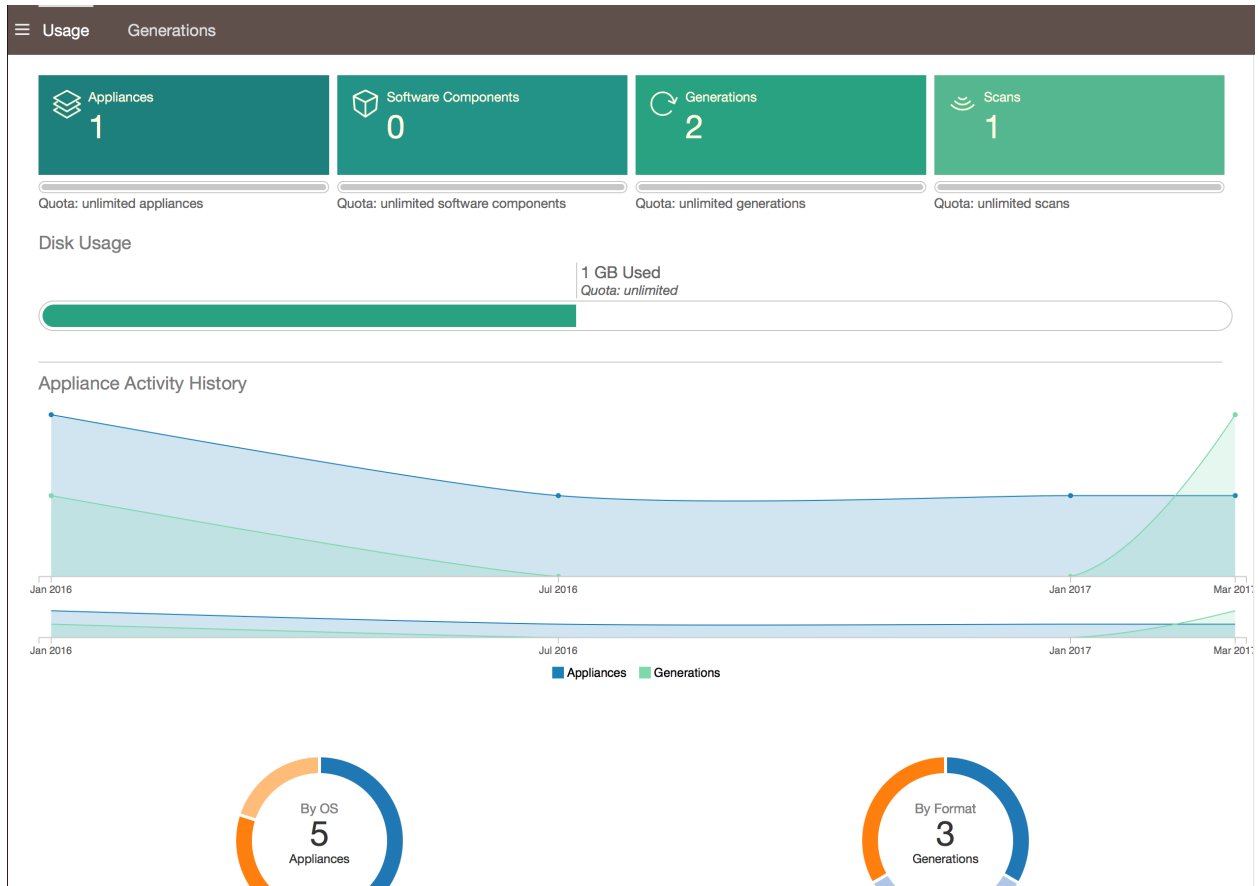
The `Generations` summary is the number of machine images you have currently stored on the platform. These machine images are generated from appliance templates or scans. Your quota usage and limit is displayed under the summary information. The quota information is measured on the number of successful machine images you have requested over a period of time; and not necessarily the number of machine images you currently have listed on your account. Even if you delete an existing machine image, the quota usage will not be changed. Your quota usage will be reset if you have a quota that is associated with a frequency (e.g. 5 generations per month). If you cancel a generation or if there is an error during the generation, the quota value is not updated.

The `Scans` summary displays the current number of successful live machine scans stored on the platform. Your quota usage and limit is displayed under the summary information. The quota information is measured on the number of successful scans you have requested over a period of time. This number does not necessarily reflect the number of scans you currently have in your account. If you delete a scan from your account the quota value is not changed. Your quota usage will be reset if you have a quota that is associated with a frequency (e.g. 5 scans per month). If you cancel a scan or if there is an error during a scan, the quota usage is not updated. This information is not shown if you do not have access to migration features.

The rest of the `Usage` page provides more detailed activity information including:

- `Your Disk Usage`. This shows the disk space consumed by you for storing software components, machine images and scan data. If you have reached your quota limit, you can delete software components, machine images or scans to save space.
- `An Appliance Activity` displaying a timeline of the number of appliance templates and machine image generations created. It also provides a breakdown of operating systems used in the appliances and the types of formats of the generated machine images.
- `A Scan Activity` displaying a timeline of the number scans and machine image generations created. It also provides a breakdown of operating systems found for each scan and the types of formats of the generated machine images.

- A **Disk Usage** displaying the disk space consumed to store your software components, machine images and scan data. This includes any software that has been imported.



Generations

The **Dashboard > Generations** view provides you a current list of machine images stored in your account along with any machine images you have published to one or more cloud environments.

Usage		Generations	
		Filter <input type="text"/>	
Generations		Publications	
	James123 1.0 r2 [841 MB] OpenStack QCOW2 Image ✓ Done, created on 27 Mar 2017 11:31.		James123 (1.0 r2) OpenStack QCOW2 Image Details 11fc5895-3940-4106-8f86-ecc8584c28fb ✓ Done, published on 27 Mar 2017 11:59.
	James123 1.0 r2 [314 MB] Amazon AWS Image ✓ Done, created on 27 Mar 2017 10:15.		James123 (1.0 r2) OpenStack QCOW2 Image Details d9175bb2-79c2-4ec7-82dc-b71ed0c568c3 ✓ Done, published on 27 Mar 2017 11:52.

Changing Your Password

To modify your password:

1. Go to the `Profile` tab on the left-hand sidebar.
2. In the top right, click on the key icon.

The screenshot shows a web interface with a 'change password' button in the top right header. A modal dialog titled 'Change Your Password' is open, featuring a key icon and three input fields: 'Current Password' (placeholder: 'Current password'), 'New Password' (placeholder: 'New password'), and 'Verify New Password' (placeholder: 'Verify new password'). The dialog has 'x', 'ok', and '✓' buttons at the bottom right. In the background, a profile form is visible with fields for 'City or town', 'State or province', 'Abkhazia', 'Home phone number', and 'Your mobile phone number'.

3. Enter your current password and your new password.
4. Click `ok`.

Managing Your Credentials

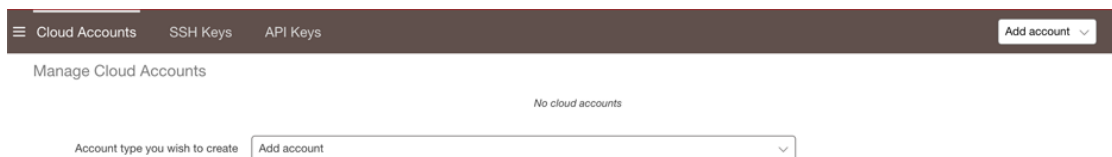
The `Credentials` tab on the left-hand sidebar allows you to modify your credentials such as: Cloud Account information, API Keys and SSH keys.

The following sub-sections go into detail on how to manage your credentials:

Managing Cloud Accounts

In order to publish an image to a cloud using UForge AppCenter, you will need to add your cloud credentials to UForge. You must have a cloud account prior to setting up your credentials on the platform. Have all the information for your cloud account on hand before starting.

1. Go to the `Credentials` tab in the left-hand sidebar.
2. Go to `Cloud Account`.
3. Select the type of account you want to create from the drop-down menu.



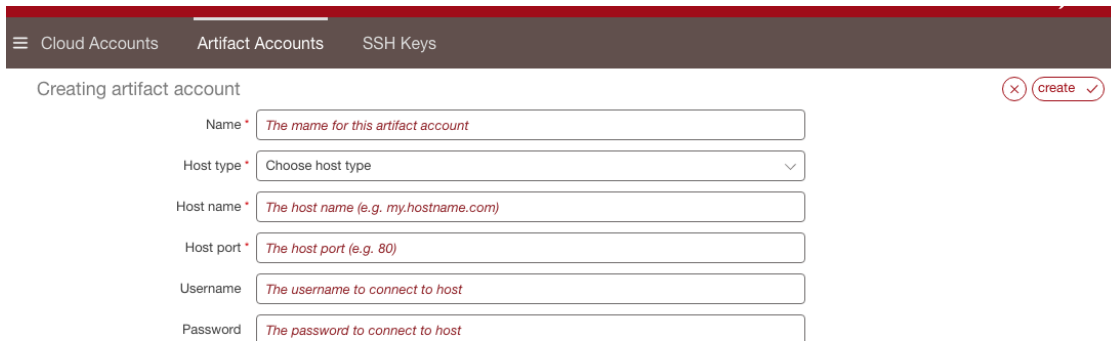
4. Scroll over any given field for more information on the mandatory information to provide for a given cloud account.
5. Click `Create` to complete.

Note: If you are an Amazon IAM user you will need to generate an X.509 Certificate following [these instructions](#) prior to creating your cloud account on UForge.

Managing Your Artifact Accounts

In order to download files for My Software, you can create an artifact account in UForge.

1. Go to the `Credentials` tab in the left-hand sidebar.
2. Go to `Artifact Account`.
3. Click on `create`.



The screenshot shows the 'Creating artifact account' form in the UForge AppCenter interface. The form is titled 'Creating artifact account' and has a 'create' button with a checkmark. The form contains the following fields:

- Name ***: A text input field with a placeholder 'The name for this artifact account'.
- Host type ***: A dropdown menu with the option 'Choose host type'.
- Host name ***: A text input field with a placeholder 'The host name (e.g. my.hostname.com)'.
- Host port ***: A text input field with a placeholder 'The host port (e.g. 80)'.
- Username**: A text input field with a placeholder 'The username to connect to host'.
- Password**: A text input field with a placeholder 'The password to connect to host'.

4. Enter a name for the account.
5. Select the type from the drop-down menu.
6. Enter the host name and port.
7. Click `create` to complete.

Managing API Keys

API Keys are used to communicate with UForge AppCenter more securely when using the platform APIs (rather than using basic authentication).

If you have the rights, you will be able to manage your API keys. See your UForge Administrator to be given these rights, if needed.

The number of API key pairs that a user can create is set by the administrator. If you have reached your quota of key pairs, contact your administrator.

To create a key pair:

1. Go to the `Credentials` on the left-hand sidebar.
2. Go to `API Keys`.
3. Click `create`.

Managing SSH Keys

You can manage one or more SSH keys that can be added to an appliance template.

To add an SSH key:

1. Go to the `Credentials` tab on the left-hand sidebar.
2. Go to `SSH Keys`.

3. Click `create`.
4. Enter the key name and the key details.

Add Public SSH Key

Tag Name *

Tag name

The public ssh key. It must begin with ssh-rsa or ssh-dss to be valid.

Public SSH Key *

✕

add ✓

5. Click `add`.

Using the REST API

UForge API is a RESTful resource.

The UForge API follows the design principles of Representational State Transfer (REST). UForge platform provides a set of resources (the API), each of which is referenced with a global identifier (URI). In order to manipulate these resources, clients communicate via the standard HTTP(S) protocol and exchange representations of these resources in a specific format. The documentation notes which formats are available for each method. The API presently supports XML and JSON. To get the results in the format of your choice, the `Accept-Type` header attribute is used in the request.

To make the UForge API easier to use, UForge has a Java SDK and Python SDK. You can create the API for other languages.

Communication with UForge is done via HTTP(S). For security reasons it is recommended to use HTTPS, however you may submit HTTP requests for debugging purposes.

- GET requests retrieve data
- POST requests create data
- PUT requests modify existing data
- DELETE request destroy existing data

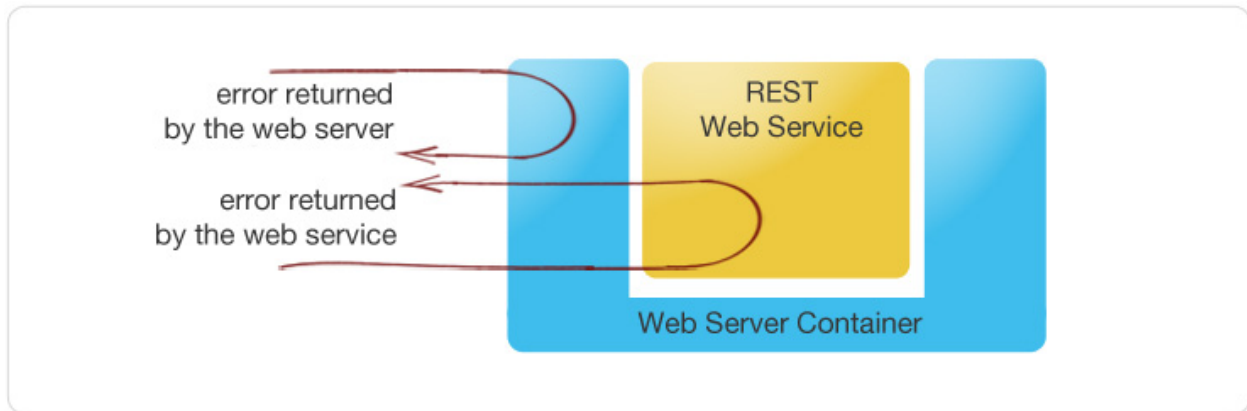
API methods that require a particular HTTP method will return an error if you do not make your request with the correct one. All HTTP methods return codified response codes.

For a complete list of all the REST interface, refer to the REST APIs Reference documentation.

Response & Error Codes

The UForge API returns typical HTTP status codes for every request received. HTTP status codes in the 200 range mean that the request was successful, while the 400 and 500 range indicates an error. The status codes in the 300 range are reserved for redirection.

Some of the error codes are returned by the web server container, while all the other response codes are returned by the UForge REST web service. Errors returned by the UForge REST web service may include a more detailed error message indicating why the request failed.



Success Codes

The following codes indicate a successful connection. The response may also include a body section providing the requested information. This information is in a MIME format specified as acceptable in the request.

- **200 OK:** Success. The request was fulfilled.
- **201 Created:** Following a POST command, a new resource has been created. The new resource URI is included in the response.
- **204 No Response:** Server has received the request but there is no information to send back. This is usually the case in a DELETE command, where a resource has been deleted
- **304 Not Modified:** Used when a client does a Conditional GET Request. If the document has not been modified since the date and time specified in If-Modified-Since field, the server responds with a 304 status code and does not send the document body to the client. The purpose of this feature is to allow efficient updates of local cache information (including relevant meta-information) without requiring the overhead of multiple HTTP requests (e.g. a HEAD followed by a GET) and minimizing the transmission of information already known by the requesting client (usually a caching proxy).

Error Codes

The 4xx codes are intended for cases where the client seems to have erred, and the 5xx codes for the cases where the server identifies that the server has erred. It is impossible to distinguish these cases in general, so the difference is only informational. The UForge platform will attempt to provide a detailed error message to help the client diagnose the problem.

- **400 Bad Request:** The request has bad syntax or was inherently impossible to satisfy.
- **401 Unauthorized:** The request did not provide an acceptable authorization parameter. The client should retry the request with a suitable Authorization header.
- **403 Forbidden:** The client does not have the privileges to access this resource. Authorization will not help.
- **404 Not found:** The server did not find anything matching the resource provided in the request.
- **409 Conflict:** Following a POST command, if the resource being created already exists.

- 415 Unsupported Media Type: The server refuses to service the request because the entity of the request is in a format not supported by the requested resource for the requested method.
- 500 Internal Error: The server encountered an unexpected condition which prevented it from fulfilling the request.
- 502 Bad Gateway: UForge is down or being upgraded.
- 503 Service Unavailable: UForge is overloaded with requests. Try again later.

Sending a Request

The UForge Platform Services are all RESTful services, where clients communicate via the standard HTTP(S) protocol. That means you can easily construct request URLs that will work on the command line and in your code.

All UForge requests (with some exceptions) require authentication information as part of the request.

The UForge REST API uses a public and secret API key pair for authenticating each request. The public key is inserted as a query in the request URI. The secret key is then used to encode the entire URI to create a signature using HMAC_SHA1. This signature is then added to the end of the request URI.

Note that you can use Basic Authentication by adding an extra HTTP header `Authorization:Basic username:password`. However, this is less secure. We recommend this only be used on local area networks for instance.

All request URLs start with the hostname of where UForge is running, the port where UForge is listening for incoming requests, the service name and version number. This is known as the BASE URL. Such request URLs resemble the following sample:

```
https://myuforge.example.com:443/api
```

Even though UForge accepts HTTP requests, it is highly recommended for security reasons that HTTPS requests be used. HTTP requests should only be used for debugging purposes. Sensitive information will be exposed using HTTP.

The Request Headers

UForge expects certain headers containing authentication information to be present as part of the URL request. UForge also accepts other header information, for example, to specify response content type and caching.

Request Example

The following is an example of a request sent to an UForge platform with hostname `10.0.0.20` using `cURL` to get the user `myUser`. Note that the response body (the user information) has been omitted here for clarity:

```
$ curl 'http://10.1.2.206/api/users/myUser?apiKey=XX8Bs2prKpdFrKH_
↪i4rsW7WR0f4FQ05IO7A8vuQUoNDino-7513mmEDecIAzpeMwWXZvnyZ6W0bJTKBwwc&
↪signature=3qDloxLwOI321BJlpDZ6Dzmqbac%3D' -H "Accept: application/xml" -v

* Trying 10.1.2.206...
* Connected to 10.1.2.206 (10.1.2.206) port 80 (#0)
> GET /api/users/guest HTTP/1.1
> Host: 10.1.2.206
> User-Agent: curl/7.42.1
> Accept: application/xml
```

```
< HTTP/1.1 200 OK
< Date: Mon, 29 May 2017 14:28:19 GMT
< Server: Apache
< Last-Modified: Mon, 29 May 2017 08:49:24 GMT
< ETag: "837201f6b809de2aeedca4814e7a85e5"
< Content-Language: en
< version: 3.7.4-SNAPSHOT
< Content-Type: application/json
< Set-Cookie: JSESSIONID=708921B1F0C2AFA55262119F5E321FAF; Path=/ufws/; HttpOnly;
↪HttpOnly;Secure
< Connection: close
< Transfer-Encoding: chunked
```

The example illustrates the following:

- a GET request is sent (cURL by default uses GET) on the resource: `/users/myUser`
- an API key is used in this case for authorization
- the `Accept` header is being used to request that the response be sent in XML.
- the response header includes `ETag` and `Last-Modified` allowing cache validation and a conditional GET requests.

Response Body Types

The API response types supported are XML or JSON. The `Accept` header is used in the request to determine which response type you would like.

- For JSON, use: `-H "Accept: application/json"`
- For XML, use: `-H "Accept: application/xml"`

If no `accept` header is used, then XML is returned by default.

For example, to retrieve the user information in JSON, the following request is used:

```
$ curl "http://10.1.2.206/api/users/guest" -X GET -u "guest:guest_password" -H
↪ "Accept: application/json"

.. note:: This example has used basic authentication (which is not advised). ↪
↪ Furthermore, the response body i.e. the user information has been omitted here for ↪
↪ clarity.
```

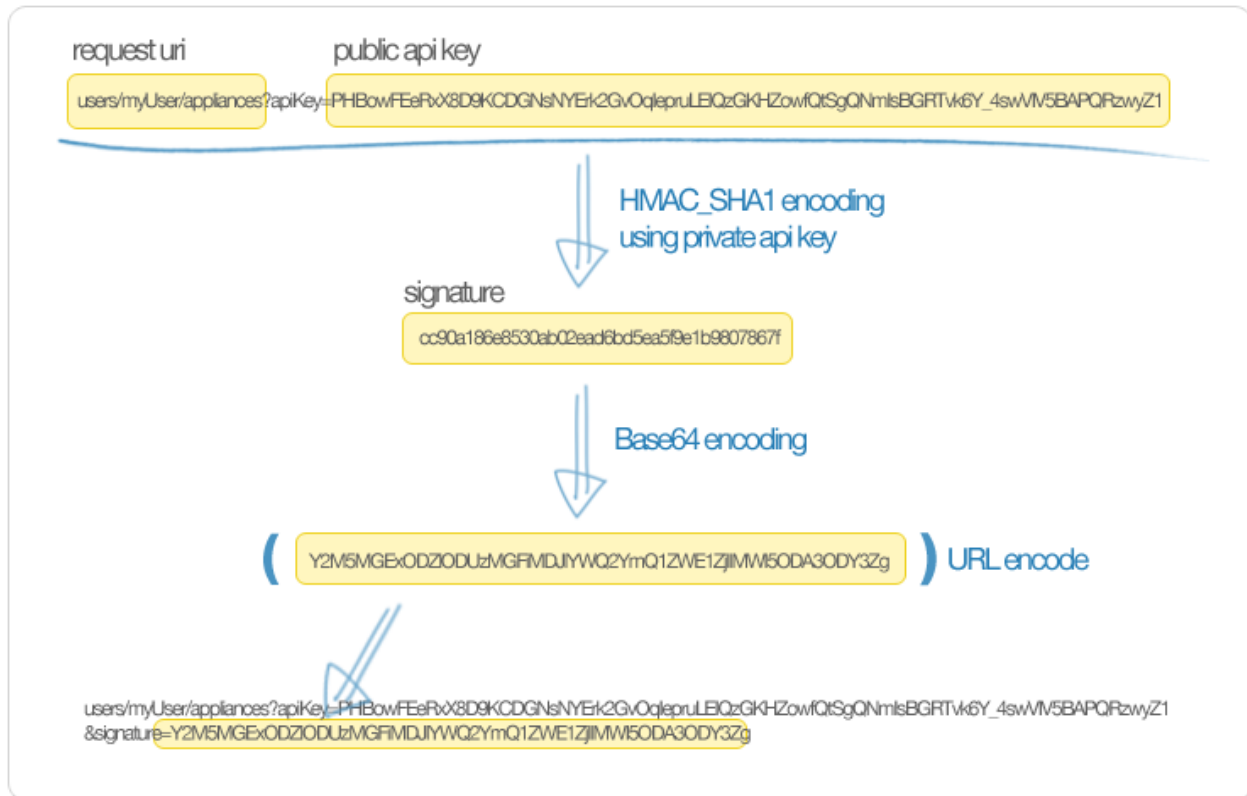
Using the API Keys

To use the UForge AppCenter APIs, it is recommended to use a public and secret API key as part of the request. This allows UForge AppCenter to correctly authenticate and authorize the request. API key pairs are managed on the [My Accounts](#) page under [API Key](#). If you cannot see this tab, then you do not have the right to access UForge via the APIs. Contact your administrator for an initial API key pair.

The API keys are used inside and to sign each request URI to the UForge platform. The creation of a properly signed request URI is done in 5 steps:

1. Add the public API key to the end of the request URI with the query parameter `apiKey`.
2. Encrypt the request URI using `HMAC_SHA1` with your secret API key to create a signature string.

3. Encode the signature string using Base64.
4. URL encode the signature string.
5. Add the signature to the end of the request URI created in step 1 with the query parameter `signature`.



Query Parameters

Certain resources within the UForge AppCenter API allow query parameters (or query strings) as part of the request URI. This allows you to pass extra parameters during search requests or to restrict the response data.

To pass a query parameter in a URL, the question mark symbol (?) is used as a separator. For example:

```
http://server/uripath?query_string
```

The query string is composed of one or more field-value pairs, each separated by the equals symbol (=). The series of field pairs is separated by the ampersand symbol (&). For example:

```
http://server/uripath?field1=value1&field2=value2&field3=value3
```

REST API Examples

For clarity, the following examples use basic authentication to communicate with UForge. As this is an insecure request, this is not recommended for production use. All response information is also omitted.

Retrieving a User

To retrieve a user's profile information use the API resource:

GET /users/{uid}

- uid: is the login of the user

Example:

```
$ curl "http://10.1.2.206/api/users/guest" -X GET -H "Authorization: Basic_
↪guest:guest_password" -H "Accept: application/xml" | tidy -xml -indent -quiet
```

References:

- API referenc: user_get

Adding a Cloud Account

A cloud account is used to register machine images that have been generated from an appliance template. To create a cloud account use the API resource:

POST /users/{uid}/accounts

- uid: is the login of the user
- credAccount: CredAccount object you wish to create in the request body

Example:

```
$ curl "http://10.1.2.206/api/users/guest/accounts" -X POST -H "Authorization: Basic_
↪guest:guest_password" -H "Content-Type: application/xml" -H "Accept: application/xml
↪" --data-binary "@representation.xml" | tidy -xml -indent -quiet
```

The representation.xml content (the request body):

```
<ns0:credAccount
  xmlns:ns0="http://www.usharesoft.com/uforge"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:type="ns0:CredAccountOpenStack">
  <name>OpenStack John</name>
  <targetPlatform>
    <name>OpenStack</name>
    <type>openstack</type>
  </targetPlatform>
  <glanceUrl>http://ip:9292</glanceUrl>
  <keystoneUrl>http://ip:5000</keystoneUrl>
  <login>username</login>
  <password>password</password>
  <keystoneVersion>v3</keystoneVersion>
</ns0:credAccount>
```

References:

- API reference: cloudAccount_create
- CredAccount object

Get User Appliance Templates

To retrieve all the appliance templates for a particular user, use the following API resource:

GET /users/{uid}/appliances

•uid: is the login of the user

Example:

```
$ curl "http://10.1.2.206/api/users/guest/appliances" -X GET -H "Authorization: Basic_
↪guest:guest_password" -H "Accept: application/xml" | tidy -xml -indent -quiet
```

References:

- API resource `appliance_getAll`

Create an Appliance Template

An Appliance Template contains the model of the software stack. The model includes all the operating system packages, middleware and application software for generating an image that can be provisioned on a virtual or cloud platform. To create an appliance template, you need to decide which operating system to build the template from, as well as the name and version.

To create an Appliance Template, the following API resource is used:

POST /users/{uid}/appliances

•uid: is the login of the user

•appliance: Appliance template object you wish to create in the request body

Example:

```
$ curl "http://10.1.2.206/api/users/guest/appliances" -X POST -H "Authorization:_
↪Basic guest:guest_password" -H "Content-Type: application/xml" -H "Accept:_
↪application/xml" --data-binary "@representation.xml" | tidy -xml -indent -quiet
```

The `representation.xml` content (the request body):

```
<ns0:appliance
  xmlns:ns0="http://www.usharesoft.com/uforge">
  <name>My Appliance</name>
  <version>1.0</version>
  <description>Appliance created with UForge API</description>
  <distributionUri>distributions/1</distributionUri>
  <orgUri>orgs/1</orgUri>
</ns0:appliance>
```

References:

- API resource `appliance_create`
- Appliance object

Retrieve Available OS Profiles for an Operating System

Each appliance template can contain an OS profile. This lists the operating system packages for the appliance template. To help users to create OS profiles for an appliance template, each Operating System registered in the UForge platform

has one or more base OS profiles (also known as OS templates) the user can choose from to get started. To retrieve the list of available OS profiles (or templates) for a particular operating system, use the following API resource:

GET /distributions/{id}/profiles

- id: is the id of the Operating System

Example:

```
$ curl "http://10.1.2.206/api/distributions/1/profiles" -X GET -H "Authorization:↵
↵Basic guest:guest_password" -H "Accept: application/xml" | tidy -xml -indent -quiet
```

References:

- API resource osTemplate_getAll
- OS Profile object

Add an OS Profile to an Appliance Template

To add an OS profile (template) to an Appliance Template, firstly list all the OS profiles for the operating system (see *Retrieve Available OS Profiles for an Operating System*) and note down the name and URI of the profile you would like to add. Then use the following API resource to add this OS profile:

POST /users/{uid}/appliances/{aid}/osprofile

- uid: is the login of the user
- aid: the id of the appliance template where to add the os profile
- OS Profile: OS profile to add to the appliance template (in the request body)

Example (Linux):

```
$ curl "http://10.1.2.206/api/appliances/1616/osprofile" -X POST -H "Authorization:↵
↵Basic guest:guest_password" -H "Content-Type: application/xml" -H "Accept:↵
↵application/xml" --data-binary "@distribprofile.xml" | tidy -xml -indent -quiet
```

The distribprofile.xml content (the request body):

```
<ns0:linuxProfile
  xmlns:ns0="http://www.usharesoft.com/uforge">
  <name>Minimal</name>
  <standardProfileUri>distribution/1/profiles/4</standardProfileUri>
</ns0:linuxProfile>
```

Example (Windows):

```
$ curl "http://10.1.2.206/api/appliances/1616/osprofile" -X POST -H "Authorization:↵
↵Basic guest:guest_password" -H "Content-Type: application/xml" -H "Accept:↵
↵application/xml" --data-binary "@distribprofile.xml" | tidy -xml -indent -quiet
```

The distribprofile.xml content (the request body):

```
<ns0:windowsProfile
  xmlns:ns0="http://www.usharesoft.com/uforge">
  <name>Standard 2012 English with agent</name>
  <standardProfileUri>distribution/9/profiles/27</standardProfileUri>
</ns0:windowsProfile>
```

References:

- API resource `applianceOSProfile_create`
- Appliance object
- Linux OS Profile object
- Windows OS Profile object

Searching for Operating System Packages (Linux Only)

Registered Operating Systems in UForge have package repositories attached to them (Linux only). You can search for packages in these repositories. These packages can then be added to an Appliance's OS profile. To search for packages, the following API resource is used:

GET `/distributions/{id}/pkgs`

- `id`: is the id of the Operating System

This would retrieve all the packages for this operating system. To carry out a search, a `search_criteria` is used. This is based on FIQL, allowing you to search for packages based on different attribute values (including names, dates etc).

Example (retrieving all packages with the name `nginx`):

```
$ curl "http://10.1.2.206/api/distributions/1/pkgs&query=(name=='*nginx*'" -X GET -H
↪ "Authorization: Basic guest:guest_password" -H "Accept: application/xml" | tidy -
↪ xml -indent -quiet
```

Note: Wildcards can be used in FIQL queries.

References:

- API resource `osPkg_getAll`
- Package object

Adding a Package to an Appliance's OS Profile (Linux Only)

Once an Appliance Template has an OS profile, you can add or remove operating system packages to it. To add one or more packages, you will need the URI of the packages(s) you wish to add. You can [search for packages](#) for packages to retrieve this information.

Use the following API resource to add or remove these packages to the OS profile of an Appliance Template:

PUT `/users/{uid}/appliances/{aid}/osprofile/{osid}/pkgs`

- `uid`: is the login of the user
- `aid`: the id of the appliance template
- `osid`: the id of the os profile to which the packages should be added

Example:

```
$ curl "http://10.1.2.206/api/appliances/1616/osprofile/2040/pkgs" -X PUT -H
↪ "Authorization: Basic guest:guest_password" -H "Accept: application/xml" --data-
↪ binary "@pkg.xml | tidy -xml -indent -quiet
```

The `pkg.xml` content (the request body):

```
<ns0:packages xmlns:ns0="http://www.usharesoft.com/uforge">
  <addedPkgUri>
    <uri>distributions/1/pkgs/631993</uri>
  </addedPkgUri>
</ns0:packages>
```

Removing the same package, the `pkg.xml` content would be (the request body):

```
<ns0:packages xmlns:ns0="http://www.usharesoft.com/uforge">
  <deletedPkgUri>
    <uri>distributions/1/pkgs/631993</uri>
  </deletedPkgUri>
</ns0:packages>
```

References:

- API resource `applianceOSProfilePkg_updateAll`
- Package object

Adding Custom Software to an Appliance Template

Software components can also be added to an Appliance Template. This is done in four stages:

1. A software component container is created. This is registered into your software library.
2. Create a software artifact container. This is the meta-data container for an uploaded file
3. Upload the software files into this software artifact container.
4. Add the software component to an appliance template. Note, that this software component can be added to multiple appliance templates.

To create the software component container, use the following API resource:

POST /users/{uid}/mysoftware

- `uid`: is the login of the user

Example:

```
$ curl "http://10.1.2.206/api/users/guest" -X POST -H "Authorization: Basic_
↪guest:guest_password" -H "Accept: application/xml" --data-binary "@software.xml |_
↪tidy -xml -indent -quiet
```

The `software.xml` content (the request body):

```
<ns0:mySoftware xmlns:ns0="http://www.usharesoft.com/uforge">
  <name>Zabbix</name>
  <version>3.0.1</version>
</ns0:mySoftware>
```

Once created, note down the `artifactsUri` of this software component. This is the URI we need to use to register one or more artifact objects.

Now we can create an artifact container. To do this use the `uri` of the software component. The resource API is:

POST /users/{uid}/mysoftware/{msid}/artifacts

- `uid`: is the login of the user
- `msid`: the id of the software compnent created

Example (uploading a RPM, but this can be any file type):

```
$ curl "http://10.1.2.206/api/users/guest/mysoftware/918/artifacts" -X POST -H
↪ "Authorization: Basic guest:guest_password" -H "Accept: application/xml" --data-
↪ binary "@artifact.xml | tidy -xml -indent -quiet
```

The artifact.xml content (the request body):

```
<ns0:softwareFile
  xmlns:ns0="http://www.usharesoft.com/uforge">
  <name>
    zabbix-release-3.0-1.el6.noarch.rpm
  </name>
  <fullName>
    zabbix-release-3.0-1.el6.noarch.rpm
  </fullName>
  <origName>
    zabbix-release-3.0-1.el6.noarch.rpm
  </origName>
  <subSoftwareArtifacts/>
</ns0:softwareFile>
```

Now you can upload the binary. Note down the `binaryUri` of the newly created artifact object. This is the resource uri you use to upload the file:

. function:: POST /users/{uid}/mysoftware/{msid}/artifacts/{said}/bin/{fileName}

- uid: is the login of the user
- msid: the id of the software component created
- said: the id of the software artifact
- fileName (optional): The filename to upload

Example (uploading a RPM, but this can be any file type):

```
$ curl "http://10.1.2.206/api/users/guest/mysoftware/918/artifacts/1078/bin/" -X POST
↪ -H "Authorization: Basic guest:guest_password" -H "Accept: application/xml" --data-
↪ binary "/path/to/file/zabbix-release-3.0-1.el6.noarch.rpm" | tidy -xml -indent -
↪ quiet
```

Finally you can now add this software component to an appliance template. The following resource API is used:

. function:: PUT /users/{uid}/appliances/{aid}

- uid: is the login of the user
- aid: the id of the appliance template

Example:

```
$ curl "http://10.1.2.206/api/users/guest/api/appliances/1616" -X PUT -H
↪ "Authorization: Basic guest:guest_password" -H "Accept: application/xml" --data-
↪ binary "@appliancesoftware.xml" | tidy -xml -indent -quiet
```

The appliancesoftware.xml content (the request body):

```
<ns0:appliance xmlns:ns0="http://www.usharesoft.com/uforge">
  <name>My Appliance</name>
  <version>1.0</version>
  <distributionUri>distributions/1</distributionUri>
```

```
<orgUri>orgs/1</orgUri>
<uri>users/guest/api/appliances/1616</uri>
<mySoftwareList>
  <mySoftware>
    <name>Zabbix</name>
    <version>3.0.1</version>
    <uri>users/guest/mysoftware/918</uri>
  </mySoftware>
</mySoftwareList>
</ns0:appliance>
```

References:

- Create software component resource mySoftware_create
- Create software artifact resource mySoftwareArtifact_add
- Upload a binary file mySoftwareArtifact_upload
- Add software component to an appliance template appliance_update
- Software Component object
- Software Artifact object
- Appliance object

Generate a Machine Image

Machine images can be generated from appliance templates by using the following API resource:

POST /users/{uid}/appliances/{aid}/images

- uid: is the login of the user
- aid: the id of the appliance template

Example (generating an OpenStack QCOW2 image):

```
$ curl "http://10.1.2.206/api/users/guest/api/appliances/1616/images" -X POST -H
  ↳ "Authorization: Basic guest:guest_password" -H "Accept: application/xml" --data-
  ↳ binary "@generateimage.xml" | tidy -xml -indent -quiet
```

The generateimage.xml content (the request body):

```
<ns0:image xmlns:ns0="http://www.usharesoft.com/uforge">
  <compress>false</compress>
  <targetFormat>
    <name>OpenStack QCOW2</name>
  </targetFormat>
  <installProfile>
    <memorySize>512</memorySize>
    <diskSize>2048</diskSize>
  </installProfile>
</ns0:image>
```

References:

- Generate a machine image machineImage_generate
- Machine Image object

Publish/Register a Machine Image to a Cloud Environment

Once a machine image has been generated, for certain formats, this machine image can be published (also known as registered) to a corresponding Cloud environment.

To publish a machine image, the following API resource is used:

POST /users/{uid}/appliances/{aid}/images/{itid}/pimages

- uid: is the login of the user
- aid: the id of the appliance template
- itid: the id of the generated machine image

Example (publishing to OpenStack):

```
$ curl "http://10.1.2.206/api/users/guest/api/appliances/1616/images/346/pimages" -X_
↪POST -H "Authorization: Basic guest:guest_password" -H "Accept: application/xml" --
↪data-binary "@publishimage.xml" | tidy -xml -indent -quiet
```

The publishimage.xml content (the request body):

```
<ns0:publishImage xmlns:ns0="http://www.usharesoft.com/uforge"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:type="ns0:PublishImageOpenStack">
  <applianceUri>users/guest/api/appliances/1616</applianceUri>
  <credAccount xsi:type="ns0:CredAccountOpenStack">
    <targetPlatform>
      <name>openstack</name>
    </targetPlatform>
    <glanceUrl>http://ip:9292</glanceUrl>
    <keystoneUrl>http://ip:5000</keystoneUrl>
    <login>username</login>
    <password>password</password>
    <keystoneVersion>v3</keystoneVersion>
  </credAccount>
  <imageUri>users/guest/api/appliances/1616/images/346</imageUri>
  <keystoneDomain>Keystone Domain Example</keystoneDomain>
  <keystoneProject>Keystone Project Example</keystoneProject>
  <displayName>Machine Image Name Example</displayName>
  <publicImage>>false</publicImage>
</ns0:publishImage>
```

References:

- Publish a machine image machineImage_publish
- Machine Image object
- Publish Machine Image object

Using the Java SDK

Download and Installing the SDK

To use the UForge AppCenter Java API, you need the jar files. You can either download the jar bundle and then add the dependency jar files to your classpath, or use maven to handle all the dependencies by adding the following to your `pom.xml` file:

```
<dependency>
  <groupId>com.usharesoft</groupId>
  <artifactId>uforge-client</artifactId>
  <version>3.6</version>
</dependency>

<repository>
  <id>maven.usharesoft.com</id>
  <name>UShareSoft Repository</name>
  <url>http://maven.usharesoft.com/repository/official/</url>
  <layout>default</layout>
</repository>
```

To use the API, you must have:

- The base URL of the UForge AppCenter platform you will be communicating with, for example: `https://factory.usharesoft.com:443`
- An account on the UForge AppCenter platform you will be communicating with
- An API key pair (secret and public) for the account (or use Basic Authentication)

Communicating with UForge

The `UForgeConnector` class provides all the lower level communication with UForge AppCenter by leveraging the `Jersey client API`. This class creates HTTP packets with the correct header information and constructs the request

URI to authenticate the request (using the secret and public keys). The response is parsed by JAXB to provide POJO Java classes of the response information.

Normally the first step is to get the user information of the account being used to authenticate. The response provides the URIs to the organizations, appliances and software this user has access to. The code below shows how to recuperate the user information. Note, as UForge is completely RESTful, when the method `login()` is used, no session is created between the client and UForge. Each request will reuse the authentication information stored in this `UForgeConnector` instance.

```
import com.usharesoft.client.common.connector.UForgeConnector;
import com.usharesoft.client.common.objects.User;
import org.apache.log4j.Logger;

private static String UFORGE_BASE_URI = "https://factory.usharesoft.com:443";
private static String USER_NAME = "myUser";
public static String SECRET_API_KEY = "b90240x-
↪N5jvPqzYw8IlfYvFRuSQv9sFuNM30gNAwZ4RqY5nOt2zPdB8XyOS2hp3oKB09-XsYbNr_e4apR";

public static String PUBLIC_API_KEY =
↪"PHBowFEeRxX8D9KCDGNsNYErk2GvOqIepruLEIQzGKHZowfQtSgQNmIsBGRtvk6Y_4swVIV5BAPQRzwyZ1
↪";

UForgeConnector connector = new UForgeConnector(UFORGE_BASE_URI, USER_NAME, PUBLIC_
↪API_KEY, SECRET_API_KEY);
User me = connector.login();
logger.info("Successfully connected to UForge. User: " + me.getLoginName());
```

Creating an Appliance Template

An Appliance Template contains the model of the software stack. The model includes all the operating system packages, middleware and application software for generating an image that can be provisioned on a virtual or cloud platform. To create an appliance template, you need to decide which operating system to build the template from, as well as the name and version.

When creating an appliance or choosing an operating system, you must choose the organization where to create the appliance or to search an operating system. The user must be a member of the organization to have authorization to search the organization resources. By default a user will be a member of at least one organization.

The following code provides an example of constructing an appliance template.

```
// require to have the organization information in the connector when getting_
↪distributions
// and creating appliances
// get the first organization of the user
URI orgUri = me.getOrgUris().getUris().iterator().next();
OrgDelegate orgDelegate = new OrgDelegate(connector);
Org org = orgDelegate.get(orgUri);
connector.setOrg(org);

// Use the connector holding the user authentication information to get
// the operating system to use for constructing the appliance template
DistributionDelegate distributionDelegate = new DistributionDelegate(connector);
Distribution distribution = distributionDelegate.get(Distribution.CENTOS_5_6_I386);

// Create the appliance
ApplianceDelegate applianceDelegate = new ApplianceDelegate(connector);
```

```
Appliance appliance = new Appliance(distribution, "WordPress", "3.2.1");
appliance = applianceDelegate.create(appliance);
```

Adding an OS Profile

An Appliance Template must contain an operating system profile. This profile contains a subset of operating system packages required by the middleware and application software to run correctly. Each operating system provided by UForge contains a set of standard operating system profile templates to choose from. These contain commonly used package bundles for the operating system to run, providing the basic operating system services.

The “Minimal” OS profile contains the minimum set of packages for the operating system to run properly and provide a minimum set of networking services and administration tools.

The following code shows how to create a new OS profile from a standard OS profile template and add it to an Appliance Template.

```
// Get the minimum template from the distribution
DistribProfileTemplate osProfileTemplate = distributionDelegate.
    ↳getProfile(distribution, DistribProfile.MINIMAL);

// Create the os profile that will be added to the appliance from the template
DistribProfile osProfile = new DistribProfile(osProfileTemplate);
osProfile.setDistribProfileTemplate(osProfileTemplate);

// Create this os profile in the appliance
ApplianceOSProfileDelegate aospDelegate = new ApplianceOSProfileDelegate(connector);
osProfile = aospDelegate.create(this.appliance, osProfile);
```

Extra packages can be added to the appliance template’s OS profile.

```
// Get the current list of packages in the os profile
PkgList pkgs = aospDelegate.getPkgs(osProfile);

// Add more packages
// php53
Pkg pkg = distributionDelegate.getPkg(distribution, "php53");
if (pkg == null) {
    logger.error("Unable to retrieve the package php53 for this distribution");
    return;
}
pkgs.addExtraPackage(pkg);

// php53-common
pkg = distributionDelegate.getPkg(distribution, "php53-common");
if (pkg == null) {
    logger.error("Unable to retrieve the package php53-common for this distribution");
    return;
}
pkgs.addExtraPackage(pkg);

// php53-cli
pkg = distributionDelegate.getPkg(distribution, "php53-cli");
if (pkg == null) {
    logger.error("Unable to retrieve the package php53-cli for this distribution");
    return false;
}
```

```
pkgs.addExtraPackage(pkg);

// php53-mysql
pkg = distributionDelegate.getPkg(distribution, "php53-mysql");
if (pkg == null) {
    logger.error("Unable to retrieve the package php53-mysql for this distribution");
    return false;
}
pkgs.addExtraPackage(pkg);

// update the os profile with the new package list
aospDelegate.updatePkgs(osProfile, pkgList);
```

Generating a Machine Image

Once you are happy with the contents of an appliance template, you can then generate a machine image to practically any hypervisor or cloud environment. The following code generates a CloudStack VHD image (for Xen hypervisor). For some image types you can select the disk size and the RAM of the virtual machine to be created. These can be updated once provisioned in the cloud environment. If you have set advanced partitioning in the installation profile, then this will be used instead for the disk size. The generation is done asynchronously; the generation status gives the progress of this generation.

```
ImageDelegate imageDelegate = new ImageDelegate(connector);
Image image = new Image(appliance, ImageFormat.CLOUDCOM_VHD_FORMAT);
image.setCompress(true); // create an archive (.gz)
image.setVmDiskSize(4096); // 4GB
image.setVmMemorySize(256); // 256MB

// Launch the generation
image = imageDelegate.generate(appliance, image);

// Check the generation status every 5 seconds
OpStatus status = imageDelegate.getStatus(image);
while ( status.isComplete() == false ) {
    try {
        Thread.sleep(5000);
    } catch (InterruptedException ex) {
        //Error in a thread while trying to get the status of the cloud.com image_
        ↪generation
    }
    // Get the status
    status = imageDelegate.getStatus(image);
}

// Generation complete!
```

Publishing an Image

UForge has connectors to many of the popular cloud platforms including Amazon, Microsoft Azure, Google Compute Engine, OpenStack, CloudStack, Eucalyptus and Flexiant to name a few. Once an image has been generated you can either download the image or publish directly to a cloud environment using your own cloud account credentials. Like

generations, publishing images is asynchronous. You can get the progress of the publish from the publish status. The following code publishes a generated VHD image directly to the template library of a CloudStack environment.

```
// Create the credential information to communicate with the Cloud.com environment
CredAccount credAccount = new CredAccount();
credAccount.setType(InfraType.CLOUD_COM);
credAccount.setName("My Cloud.Com Account");
credAccount.setServerUrl(new URI("http://10.0.1.251:8080/client/api"));
credAccount.setPublicAPIKey("8pqgg0HV8ocpt6j8qYiCpDZ4cqzbtLaxCErIOpCD0r9VOjnILgahX85_
↪J2CFvC8863en3NGZEFILY82PKbAfWQ");
credAccount.setSecretAPIKey("9Q-vVxokmMbI_
↪14t7aAfbocTgoLBlnt41Xy6iLZUfC6PzAdXNy2rRegAWhBMF3mQ9jk4MtPaCVULDu7ORxX2ZQ");

// Add the zone on where the image should be published
credAccount.setZoneName("zone1");

// Provide information on the image being uploaded to the Cloud.com template library
credAccount.setDisplayName("WordPress image");
credAccount.setDescription("WordPress image for the cloud.com platform");
credAccount.setPasswordEnabled(true);
credAccount.setFeaturedEnabled(false);

// Allow this image to be accessed to all cloud.com users
credAccount.setPublicImage(true);

// Publish the image
PublishDelegate publishDelegate = new PublishDelegate(connector);
PublishImage publishImage = new PublishImage();
publishImage.setCredAccount(credAccount);
publishImage.setImage(image);
publishImage = publishDelegate.publish(appliance, publishImage);

// Get the status of the publish
OpStatus status = publishDelegate.getStatus(publishImage);
while (status.isComplete() == false) {
    try {
        Thread.sleep(5000);
    } catch (InterruptedException ex) {
        // Error in a thread while trying to get the status of the iso image_
↪generation
    }
    // get the status
    status = publishDelegate.getStatus(publishImage);
}

// Publish finished
// Can check for errors
if (status.isError()) {
    // error occurred during the publish
}
```

Adding a Project from the Project Catalog

Each UForge organization provides a Project Catalog where commonly used software components can be added to an appliance template. The Project Catalog must belong to the same organization as the appliance. The following code adds some projects to an appliance template.

```
ProjectDelegate projectDelegate = new ProjectDelegate(connector);

// Add Apache HTTP Server
Project project = projectDelegate.get(distribution, "Apache HTTP server", "2.2.3",
    null);
if (project == null) {
    logger.error("Unable to retrieve project");
    return;
}
appliance.addProject(project);

// Add MySQL
Project project = projectDelegate.get(distribution, "MySQL5 Server", "5.0.77", null);
if (project == null) {
    logger.error("Unable to retrieve project");
    return;
}
appliance.addProject(project);

// Save the updated appliance instance
applianceDelegate.update(appliance);
```

Uploading a Software Component

You can upload your own software components to a private software library (My Software Library). This software can then be added to any of your appliance templates. This provides a mechanism to compliment the Project Catalog. The following code shows how to upload files, attach a license and then add it to an appliance template.

```
MySoftwareDelegate mySoftwareDelegate = new MySoftwareDelegate(connector);
File wpf = new File("wordpress-3.2.1.zip");
File lf = new File("wp-license.html");

// Create a My Software component and upload the wordpress zip file
MySoftware mySoftware = mySoftwareDelegate.upload("WordPress", "3.2.1", wpf);

// Attach a license
mySoftware = mySoftwareDelegate.uploadLicense(mySoftware, lf);

// Add the software component to the appliance
appliance.addMySoftware(mySoftware);

// Save the changes to the appliance
applianceDelegate.update(appliance);
```

Adding a Boot Script

Boot scripts can be added to the appliance template allowing initial configuration to be executed either during the first time the image is started or during every boot of the image.

The following code shows how to upload a boot script to an appliance.

```
ApplianceConfigDelegate configDelegate = new ApplianceConfigDelegate(connector);
```

```
// upload a boot script to the appliance
File bsf = new File("myscript.sh");
BootScript bootscript = new BootScript();
// only execute this boot script once during first boot
bootscript.setBootType(BootScript.FIRST_BOOT);
bootscript = configDelegate.uploadBootScript(appliance, bootscript, bsf);
```

Using the Python SDK

Download and Installing the SDK

The Python API is supported on all major operating systems: Linux, Mac-OS, and Windows. The easiest way to install the API is using `pip`, the widely used package management system for installing and managing software packages written in Python.

Note: This API is used by the open source Hammr project. You can find more examples on how to use the API in the source code of this project.

Installing pip

If you already have `pip` installed on your system, you can skip this section.

To install or upgrade `pip`, download this file:

```
https://raw.githubusercontent.com/pypa/pip/master/contrib/get-pip.py
```

Then run the command:

```
$ python get-pip.py
```

For more information on installing `pip`, refer to the official `pip` documentation: <http://www.pip-installer.org/en/latest/installing.html>

Installing UForge Python API

Once `pip` has been installed, you can now install the UForge Python API packages. You may have to run this command as `sudo` or administrator.

See below the instructions for installing the Python API for your target platform:

For Linux

First, you need to install extra packages on your system, and then install the SDK package.

Debian

```
$ apt-get install python-dev gcc
$ pip install uforge-python-sdk
```

Red Hat and CentOS

```
$ yum install gcc python-devel
$ pip install uforge-python-sdk
```

Upgrading the SDK

To upgrade an already installed SDK, run:

```
$ pip install --upgrade uforge-python-sdk
```

For Mac OS

As a pre-requisite, you need to have XCode installed.

To install the SDK run:

```
$ export ARCHFLAGS="-Wno-error=unused-command-line-argument-hard-error-in-future"
$ pip install uforge-python-sdk
```

Upgrading the SDK

To upgrade an already installed SDK, run:

```
$ pip install --upgrade uforge-python-sdk
```

For Microsoft Windows

Run the following command:

```
c:\Python27> .\Scripts\easy_install.exe uforge-python-sdk
```

Upgrading the SDK

To upgrade an already installed SDK, run:

```
c:\Python27> .\Scripts\easy_install.exe --upgrade uforge-python-sdk
```

Communicating with UForge

The Python API provides all the lower level communication with UForge AppCenter by creating HTTP request packets with the header information to authenticate correctly.

Normally the first step is to get the user information of the account being used to authenticate. The response provides the URIs to the organizations, appliances and software this user has access to. The code below shows how to recuperate the user information. Note, as UForge is completely RESTful, when the method `login()` is used, no session is created between the client and UForge. Each request will reuse the authentication information stored in this `api` instance.

```
# Import the Uforge python API
from uforge.application import Api

login='root'
passwd='uforgedemo'

# Create the API object
api = Api(url = 'https://mylittleuforge.usharesoft.com/api',
          username = login, password = passwd,
          disable_ssl_certificate_validation = True)

# Send a request (getting the user object)
user = api.Users(login).Get()
if user is not None:
    print user.loginName + ' - ' + user.email
```

Note: All UForge Python objects are in the file `objects.py`, contained in the Python SDK. You can find all attribute names for each object type.

Creating an Appliance Template

An Appliance Template contains the model of the software stack. The model includes all the operating system packages, middleware and application software for generating an image that can be provisioned on a virtual or cloud platform. To create an appliance template, you need to decide which operating system to construct the template from, as well as the name and version.

When creating an appliance or choosing an operating system, you must choose the organization where to create the appliance or to search an operating system. The user must be a member of the organization to search the organization resources.

The following code provides an example for constructing an appliance template. You will then need to add an OS profile to the template. Refer to [Adding an OS Profile to the Appliance](#).

```
# Import the Uforge python API
from uforge.application import Api
from uforge.objects.uforge import *

login='root'
```

```

passwd='uforgedemo'

# Create the API object
api = Api(url = 'https://mylittleuforge.usharesoft.com/api',
          username = login, password = passwd,
          disable_ssl_certificate_validation = True)

# all Orgs
newOrg = api.Users(login).Orgs().Getall()
#for i in newOrg.orgs.org:
#    print i.uri + " - " + i.name

# all Distributions
newDistribution = api.Users(login).Distros.Getall()
#for i in newDistribution.distributions.distribution:
#    print i.uri + " - " + i.name + " " + i.version + " " + i.arch

newAppliance = appliance()
newAppliance.name = "applttestpythonsdk"
newAppliance.version = "2.3"
# Let's use first organization
newAppliance.orgUri = newOrg.orgs.org[0].uri
# Let's use first distribution
newAppliance.distributionUri = newDistribution.distributions.distribution[0].uri

# create appliance
try:
    createdAppliance = api.Users(login).Appliances.Create(newAppliance)
except Exception as e:
    print str(e.args[0].statusCode)+" "+e.args[0].localizedErrorMsg.message
    sys.exit(1)
print "Created appliance: " + createdAppliance.uri

```

Adding an OS Profile to the Appliance

An Appliance Template must contain an operating system profile. This profile contains a subset of operating system packages required by the middleware an application software to run correctly. Each operating system provided by UForge contains a set of standard operating system profile templates to choose from. These contain commonly used package bundles for the operating system to run, providing the basic operating system services.

The “Minimal” OS profile contains the minimum set of packages for the operating system to run properly and provide a minimum set of networking services and administration tools.

The following code shows how to create a new OS profile from a standard OS profile template and add it to an Appliance Template. The Appliance template must already be created, as described in *Creating an Appliance Template*.

```

# List available osprofiles for this distribution to apply on appliance
newProfile = api.Distributions(newDistribution.distributions.distribution[0].dbId).
    Profiles.Getall()
newProfile = newProfile.distribProfileTemplates.distribProfileTemplate
#for profile in newProfile:
#    print profile.name
print "Will set profile: " + newProfile[0].name + " - " + newProfile[0].uri

newApplianceOSProfile = distribProfile()
newApplianceOSProfile.standardProfileUri = newProfile[0].uri

```

```
# apply os profile
try:
    api.Users(login).Appliances(createdAppliance.dbId).Osprofile().
    ↪Create(newApplianceOSProfile)
except Exception as e:
    print str(e.args[0].statusCode)+" "+e.args[0].localizedErrorMsg.message
    sys.exit(1)
print "Profile applied."
```

Generating a Machine Image

Once you are happy with the contents of an appliance template, you can then generate a machine image to practically any hypervisor or cloud environment. The following code generates a CloudStack VHD image (for Xen hypervisor). For some image types you can select the disk size and the RAM of the virtual machine to be created. These can be updated once provisioned in the cloud environment. If you have set advanced partitioning in the installation profile, then this will be used instead for the disk size. The generation is done asynchronously.

```
# all target formats, search for VirtualBox
newTargetFormat = api.Users(login).Targetformats.Getall()
for i in newTargetFormat.targetFormats.targetFormat:
    # print i.uri + " - " + i.name
    if i.name == "VirtualBox":
        print "VirtualBox target format found for user " + login + "."
        break

if i.name != "VirtualBox":
    print "VirtualBox target format not found for user " + login + ", will not_
    ↪generate."
    sys.exit(1)

newImage = image()
newImage.compress = "true"
newTargetFormat = targetFormat()
newTargetFormat.name = "VirtualBox"
newImage.targetFormat = newTargetFormat
newInstallProfile = installProfile()
newInstallProfile.memorySize = 512
newImage.installProfile = newInstallProfile

# generate target Virtualbox
try:
    api.Users(login).Appliances(createdAppliance.dbId).Images().Generate(newImage)
except Exception as e:
    print str(e.args[0].statusCode)+" "+e.args[0].localizedErrorMsg.message
    sys.exit(1)
print "Launched generation of appliance for VirtualBox target format."
```

Creating My Software

In addition to projects and OSes, you can add your own personal software to an appliance. In order to do this, you must create a My Software container, add the packages (refer to [Adding a Package to My Software](#)), and (optionally) add a license (refer to [Uploading a License to My Software](#)). Once you have created the My Software, you can then add it to an appliance.

```
# Import the Uforge python API
from uforge.application import Api
from uforge.objects.uforge import *

import os

login='root'
passwd='uforgedemo'

# Create the API object
api = Api(url = 'https://mylittleuforge.usharesoft.com/api',
          username = login, password = passwd,
          disable_ssl_certificate_validation = True)

newMySoftware = mySoftware()
newMySoftware.name = "newmstest"
newMySoftware.version = "5.6"
newMySoftware.description = "This is the description."

try:
    createdMySoftware = api.Users(login).Mysoftware().Create(newMySoftware)
except Exception as e:
    print str(e.args[0].statusCode)+" "+e.args[0].localizedErrorMsg.message
    sys.exit(1)
print "Created mysoftware: " + createdMySoftware.uri
```

Adding a Package to My Software

Once you have created the My Software container, you can add packages (files) using the following code. For a list of supported file formats, refer to the list provided in *Adding Software from Your Software Library*.

```
myNewPackage = package()
myNewPackage.origName = "/etc/redhat-release"

try:
    myNewPackage.size = os.stat(myNewPackage.origName).st_size
except Exception as e:
    print "Problem reading file " + myNewPackage.origName + ". Will not be added_
↳to mysoftware."
    sys.exit(1)

# add package file to mysoftware
try:
    api.Users(login).Mysoftware(createdMySoftware.dbId).Pkgs().Add(myNewPackage)
except Exception as e:
    print str(e.args[0].statusCode)+" "+e.args[0].localizedErrorMsg.message
    sys.exit(1)
print "Added package file " + myNewPackage.origName + " to mysoftware."
```

Uploading a License to My Software

If you want to add a license file to your software (optional), add the following code.

```

try:
    myLicenseFile = open("/etc/redhat-release")
except Exception as e:
    print "Problem reading file " + myLicenseFile.name + ". Will not add license_
↳to mysoftware."
    sys.exit(1)

# add license file to mysoftware
try:
    api.Users(login).Mysoftware(createdMySoftware.dbId).
↳Licenses(createdMySoftware.license.dbId).Uploadfile(myLicenseFile)
except Exception as e:
    print str(e.args[0].statusCode)+" "+e.args[0].localizedErrorMsg.message
    myLicenseFile.close()
    sys.exit(1)
print "Added license file " + myLicenseFile.name + " to mysoftware."

myLicenseFile.close()

```

Listing All My Software

You can list all your private software for your account as follows:

```

print "Listing all mysoftware:"
# all MySoftware
newMySoftware = api.Users(login).Mysoftware().Getall()
for i in newMySoftware.mySoftwareList.mySoftware:
    print " ID " + str(i.dbId) + " " + i.name + " v" + i.version + " " + ("",
↳ "IMPORTED")[i.imported == True]

```

Creating a Project for a Specific OS

You can also add third-party software to an appliance using projects. The catalog of projects is public to all users on UForge and is maintained by the privileged users and administrators.

```

# Import the Uforge python API
from uforge.application import Api
from uforge.objects.uforge import *

login='root'
passwd='uforgedemo'

# Create the API object
api = Api(url = 'https://mylittleuforge.usharesoft.com/api',
          username = login, password = passwd,
          disable_ssl_certificate_validation = True)

# all Distributions
newDistribution = api.Users(login).Distros.Getall()
#for i in newDistribution.distributions.distribution:
#    print i.uri + " - " + i.name + " " + i.version + " " + i.arch

# all Organisations
newOrg = api.Users(login).Orgs().Getall()

```

```

# create a project for 1st distribution and 1st organisation
newMyProject = project()
newMyProject.name = "testnewproject"
newMyProject.version = "1.9"
newMyProject.release = "14"
newMyProject.category = "Blogging"
newMyProject.shortTag = "INTERNAL"
newMyProject.description = "test new project description"
newMyProject.company = company()
newMyProject.company.name = "UShareSoft"
newMyProject.license = license()
newMyProject.license.type = "Custom"
newMyProject.distributionUri = newDistribution.distributions.distribution[0].uri

try:
    createdproject = api.Orgs(newOrg.orgs.org[0].dbId).Projects.
    ↪Create(newMyProject)
except Exception as e:
    print str(e.args[0].statusCode)+ " " +e.args[0].localizedErrorMsg.message
    sys.exit(1)
print "Created project: " + createdproject.uri

```

Listing all Projects for a Specific OS

```

# listing all projects for same distribution
print "Listing projects for distribution " + newDistribution.distributions.
    ↪distribution[0].name + " " + \
        newDistribution.distributions.distribution[0].version + " " + \
        newDistribution.distributions.distribution[0].arch + ":"
print "-v-----"
newProjects = api.Distributions(newDistribution.distributions.distribution[0].dbId).
    ↪Projects.Getall()
for i in newProjects.projects.project:
    print " +- " + i.uri + " - " + "\033[1m\033[93m" + i.name + " v" + i.version_
    ↪+ " r" + \
        str(i.release) + "\033[0m" + "\t(tag: " + i.shortTag + ") (size: +" +
    ↪str(i.size/1024/1024) + "MB)"
    print (" |", " ") [i == newProjects.projects.project[-1]] + "    path: " + i.
    ↪defaultInstallLocation
    print (" |", " ") [i == newProjects.projects.project[-1]] + "    category: " +
    ↪i.category + \
        "                               maintainer: " + i.company.name
    if i.description:
        print (" |", " ") [i == newProjects.projects.project[-1]] + "    _
    ↪description: " + i.description

```

Listing Target Formats and Target Platforms

```

# Import the Uforge python API
from uforge.application import Api
from uforge.objects.uforge import *

login='root'

```

```

passwd='uforgedemo'

# Create the API object
api = Api(url = 'https://mylittleuforge.usharesoft.com/api',
          username = login, password = passwd,
          disable_ssl_certificate_validation = True)

# all Organisations
newOrg = api.Users(login).Orgs().Getall()

targetformatswithtargetplatform = []
# all target platforms & target formats
allTargetPlatforms = api.Orgs(newOrg.orgs.org[0].dbId).Targetplatforms().Getall()
for i in allTargetPlatforms.targetPlatforms.targetPlatform:
    print i.uri + " \033[1m\033[93m" + i.name + ":\033[0m" + \
          " (type " + i.type + ") (" + \
          ("not active, ","active, ")[i.active] + \
          ("no access)","access")[i.access]

    allTargetFormats = api.Orgs(newOrg.orgs.org[0].dbId).Targetplatforms(i.dbId).
    ↪Targetformats().Getallformats()
    for u in allTargetFormats.targetFormats.targetFormat:
        targetformatswithtargetplatform.append(u.uri)
        print "          " + u.uri + " : \033[96m" + u.name + "\033[0m (type " + u.
    ↪type + ") (" + \
          ("not active, ","active, ")[u.active] + \
          ("no access)","access")[u.access]

print "\033[1m\033[93mNo target platform:\033[0m"
allTargetFormats = api.Orgs(newOrg.orgs.org[0].dbId).Targetformats().Getall()
for u in allTargetFormats.targetFormats.targetFormat:
    if u.uri not in targetformatswithtargetplatform:
        print "          " + u.uri + " : \033[96m" + u.name + "\033[0m (type " + u.
    ↪type + ") (" + \
          ("not active, ","active, ")[u.active] + \
          ("no access)","access")[u.access]

```


CHAPTER 10

Hammr Command Line Tool

UForge AppCenter provides an open source command-line tool called `hammr` to allow users to create machine images for different environments from a single configuration file.

Build consistent and repeatable machine images for :



Hammr is a lightweight client-side tool based on Python, and can be installed on all major operating systems.

Hammr can be used as part of your “DevOps tool chain” and in conjunction with other tools such as Jenkins, Chef, Puppet and SaltStack, allowing you to easily build your machine images and maintain your live running instances. Hammr also has migration capabilities, allowing you to scan a live system, generate a machine image for a different environment as well as export it back to a configuration file for sharing.

Getting the Source Code

All the source code is available on [GitHub](#).

Further Reading

All the documentation on installing and using hammr can be found on: <http://hammr.io>

CHAPTER 11

Using UForge CLI

You can manage UForge AppCenter using the UForge command-line interface (CLI).

Installing UForge CLI

The UForge CLI is available for CentOS 6 clients.

In order to install the version of the UForge CLI which corresponds to your UForge AppCenter, please ask your administrator to provide you with the `/etc/yum.repos.d/uforge-ee-centos.repo` file of the UForge AppCenter installation.

Then, run the following commands:

To install the UForge CLI run:

```
yum clean all
yum install uforge-cli
```

Launching UForge CLI

To launch UForge CLI locally on the machine, launch:

```
/opt/UShareSoft/uforge/cli/bin/uforge -u LOGIN_NAME -p PASSWORD -U http://IP-OF-  
↪MACHINE/api
```

The `-p` argument is optional. If the password is not entered in the command, the user will be prompted to enter their password.

Use `--help` to get a list of available commands.

Note: When accessing from outside the machine, use: <https://IP-OF-MACHINE/api>

3.7.fp5

Release Date: 2017-06-12

New Features

- Add a mechanism to restrict the usage of a project (for Administrator) or software bundle (in MySoftware for users) based on a Distribution name, family, architecture or for an output format
- Administrators can now create a golden image from the UI. Once a Windows scan is complete, the Administrator can import the scan as a golden image. This golden image will be available to users to create new Windows appliances.
- Publication to VMware vCenter improved. UForge now publishes templates to VMware vCenter, rather than instances. The datacenter information (ESXi hypervisor, datastore, network name, etc) is automatically retrieved by UForge and prefilled for publication to VMware VCenter.

Bug Fixes

- 7560 Oracle Linux is treated as RHEL at scan
- 7622 OpenSUSE generation Failed with default OS Profile due to package conflict.
- 7423 CentOS 7.3 VBox image never ends up booting if '/' partition is a logical volume
- 7429 Error message is always logged in oar error log "unary operator expected" when generating Linux image.
- 7361 Windows generation error when disk too small does not raise an understandable error message
- 7620 db_modifs and postupdate mods applied to several versions of UForge are not handled properly by update_mechanism
- 7758 On the generation UI pages, there is a CSS issue between headers and content

- 7853 License of WS2008R2 is displayed on WS2012R2
- 7771 Hover message on items in scan list is not internationalized
- 7871 Updating the certificate of a google cred account generates a null pointer exception and “this should never happen, please updateTemplateInfo” in the UI
- 7682 Published image tag summary displayed wrong tooltip
- 7635 The type of the password input field of artifact accounts is inconsistent in the UI
- 7584 Applications and Services for Windows are not parsed correctly
- 7767 Missing timezone data on branch master
- 7897 500 error occurs in image generation using a template without a partition table
- 7669 The EventController service does not consume ScanAction event correctly
- 6285 AWS publication is not working behind an external http proxy
- 7630 Outscale publish connector is not working anymore
- 6789 When booting a migrated instance, haldaemon starts although autostart setting is off in the source machine
- 7298 Import/Export Software bundle fails with “Permission denied error”

3.7.fp4

Release Date: 2017-05-02

New Features

- New user dashboard providing usage statistics and quota information
- New option to scan a live machine without transferring any overlay information (allowing a light-weight audit of the instance)
- Support to create appliance templates based on Windows 2016 operating system
- Ability to scan and migrate Windows 2016 instances
- Application and services information now captured and displayed when scanning a Windows-based instance

Enhancements

- Ability to export an appliance template in either YAML or JSON format (default now YAML)
- Enhanced the information displayed after registering machine images to a cloud environment. machine ID and cloud location (region, zone etc depending upon the cloud target) now displayed in the UI

Bug Fixes

- 7553 A workload based on Scientific Linux cannot be scanned
- 7546 Scanning failed at Phase 6 (heap memory in eventcontroller to the even bus - message too large)
- 7534 Wrong values in /etc/fstab if the appliance has both partition ‘/’ and partition ‘/boot’
- 7521 `hammr template import` fails for certain types of advanced partitioning tables

- 7500 K5 publication fails with message “Error creating publish command for K5”
- 7436 500 call fail when displaying the detailed information of a scan when i18n is Japanese
- 7403 Windows scan command displayed in the UI is wrong
- 7369 Error badly handled during appliance import if message contains “”
- 7360 Oracle Linux 7 and Scientific Linux 7 machine images do not boot if the appliance templates has logical volumes
- 7340 Scanning a server with a file larger than 40 GB fails
- 7314 Cannot generate a machine image for Fujitsu K5 format from a scan
- 7229 Registering a machine image to AWS fails with Java `PublishCommunicator` error
- 7157 The scan binary ignores option `-e "/"`
- 7153 Scan cannot treat files whose name includes `>`
- 7147 Docker publish does not work anymore
- 7092 When launching Service Management Tool from `run -> services.msc`, an error occurs
- 7071 The check box `Ignore dependency checking warnings` is displayed in the UI when a Windows image is created
- 7063 Inconsistent update of template revision
- 6960 Simultaneous scans of two CentOS 7.3 machines fails
- 6932 When cloning an imported appliance and exporting, the wrong page is displayed
- 6748 Unable to download a generated machine image via the UI twice
- 5977 When resetting password, the information message to indicate that an email has been sent is badly positioned
- 5907 When inviting a collaborator to a workspace, email textbox is case insensitive
- 5074 Bad vertical aligned text in expandable button

3.7.fp3

Release Date: 2017-03-21

New Features

- Users can now import a Windows based scan, creating an appliance template. This allows users to update the appliance template prior to migration.
- Users can specify to run `sysprep` as part of a machine image generation for Windows-based appliances that have been imported from a Scan. This allows users to provide a new administrator password as part of the install profile.
- Ability to trigger Repository updates manually via an API call.

Enhancements

- The UI updated to display the language, type and edition of Windows OS profile
- The UI can be customized to allow hyperlinks in the footer or header to either open in a new tab (default) or in the same tab (replacing the UI).
- API Keys now have optional name and description meta-data to help the user identify what API keys are used for.

Bug Fixes

- 7146 Scan cannot treat files whose name includes >
- 6995 The scan status is not updated to `error` when the error occurs during uploading
- 6993 A file or directory name whose include a line feed (LF) is not present in the scan result
- 7069 Upload a logo which is not `png` or `jpg` raise an error but erase the existing logo
- 7065 Incorrect warning message when appliance has multiple disks during generation of some formats
- 7061 Issue when adding PDF files as custom license to project (should not be allowed)
- 7035 `rpmgen -e` (exclude dir list) option is not working correctly
- 7074 MySoftware files are not copied on the filesystem when generating CentOS7 ISO images
- 7024 Windows scan of a machine with 2 disks, when user excludes 1 disk, UForge still creates 2 disks in the scan meta data
- 7067 `uforge org category delete` fails with two arguments
- 7029 Cannot create unformatted logical volumes
- 6939 My profile picture is not displayed on Activity Stream Workspace
- 7048 Search for packages does not take into account hour of the day
- 6873 Amazon publication - S3 bucket is not necessary anymore
- 7009 UForge root password can not be changed wrong message
- 7002 Spider do not cleanup all temporary dirs in `/tmp`
- 6948 Projects non-native files are ignored if my software has the same name.
- 7003 Windows generation is failing during OS check
- 6998 When exporting a linux appliance without OS Profile an internal server error is raised
- 6986 After delete a custom license in MySoftware or Project , the icon `done.svg` is still visible
- 6971 After K5 Black box migration, Firewall setting changes to enable in Cent OS 6.
- 6970 CentOS 6 scan and generation leads to an error
- 6884 Generation of AWS image for Windows Server 2012R2 fails with illegal seek exception
- 6834 After the migration from 3.5.1 to 3.6, created API keys no longer displayed in the UI
- 6964 Canceling the K5 publication finishes with ERROR message.
- 6961 Incoherence in template and mysoftware revisions when sharing to workspace
- 6963 Internal generation tools must generate the correct guestOS inside `vmx` when `windows+vmware`

- 6747 An image can be downloaded more than once by using the URL with same Download ID
- 6855 Cannot retrieve directory from remote site with http basic authentication in software library.
- 6794 Documentation mentions copyright in customisation but copyright is not displayed
- 6870 A generated CentOS 6.8 image kernel panics if it has a logical volume in the partitioning table
- 6815 Cannot pull files from FTP in MySoftware.
- 6875 When uploading a file for the second time the confirm popup has two handlers and so the action is carried out twice
- 6872 Success message for `org os add` is not correct
- 6800 Cannot download non-cached software artifact correctly if the remote file size has been changed.
- 6819 While scanning Windows OS, Scan progress is continued to copy on the clipboard.

3.7.fp2

Release Date: 2017-02-13

New Features

- Support registration of machine images for Azure ARM and Azure Enterprise Accounts
- Ability to register docker images built in UForge to DockerHub. This includes managing credential information to authenticate against DockerHub.
- In `Projects` or `My Software` can now provide restrictions to determine if they are compatible with a particular OS family, type or version.

Enhancements

- Renamed `VM Builder` Tab in the UI to `Apps`.
- Better internal logging information when publishing/registering machine images to a target cloud environment.
- Better validation in the web service for information used in publishing/registering machine images.
- Better UX experience when managing and choosing pinned (or sticky) packages.
- UI now displaying the size of the generated machine images.
- Can now delete an invitation of a user to a Workspace if a user has invited someone to join a collaboration workspace, and the person is not responding, there is no way to cancel the invitation.
- Added an `Id` column for all UForge CLI commands that lists information (for better referencing in other commands).
- Added the ability to reset a user's password via the UForge CLI (`--resetPassword` option).

Compatibility Issues

Migrating to UForge 3.7-2 will have the following compatibility issues:

- any Windows golden image that use a non-standard Edition (for example Windows K5 instead of the official Standard, Enterprise, Webserver or Database) will be changed to Standard edition. A warning will be added to the log files. If you would like to change the Edition of the golden image, you should re-register the golden image with `org golden create` command.

Warning: Fujitsu is not legally responsible for any damage or loss caused by the possible inconsistency between the assumed and the actual Editions.

The following API interface and calls have been modified:

- The object `DistribProfile` is now an abstract object and is implemented by either `linuxProfile-object` or `windowsProfile-object` (which are new object types).
- The deprecated object `DistribProfileTemplate` has now been deleted. The object `distribProfile-object` is now used. The attribute `standardProfileUri` is now deprecated and been set to `null`.

Due to the above object changes, the following API calls have been modified:

- `orgOSWindows-add`
- `orgOSWindows-delete`
- `osTemplate-getAll`
- `osTemplate-get`
- `orgOSWindows-getAll`

The following API calls have been added to enhance scanned Windows-based workloads:

- `workspaceTemplateOSApplications-get`
- `workspaceTemplateOSServices-get`
- `workspaceTemplateOSPartitionTable-get`

Bug Fixes

- 6853 While scanning Windows OS, Scan progress is continued to copy on the clipboard.
- 6821 Blob name must finish with `.vhd` and add some information in the publish popup.
- 6820 Issues in properties `i18n` file.
- 6809 OpenStack account turned into another type of cloud account after the migration from 3.5.1 to 3.6.
- 6706 Fix backward compatibility for golden edition with custom names.
- 5607 Even if the scan ends the UI continues to ask for information of the scan.
- 6737 Sub menu scrollable inside the Dashboard.
- 6734 Cannot delete template with software component from workspace.
- 6732 Unexpected scroll bar in My Software view.
- 6716 Cannot download rpms from yum repos whilst scanning a centos system.
- 6713 Error message containing typo for windows disk size.
- 6711 Golden location is retrieved from `Pkgs` table, it should be retrieved from `WindowsProfile` table.
- 6672 Scan does not read `KEYBOARD` in metadata.

- 6646 File conflicts against packages built with when installing centos distribution packages.
- 6639 Primary disk size is changed to the other disk size on UI when having multiple disks.
- 6627 Cannot export a template if the software component has rpm file in Repository Packages tab.
- 6614 Creating folder failed but displayed on UI.
- 6599 i18n properties breaking master build.
- 6596 Imported appliances from archive are not counted statistics in Dashboard.
- 6529 Image generation fails when a template includes rpm file with no cached.
- 6497 Can't display Projects as guest user.
- 6495 The `org golden xxx` command fails if edition name in db is not allowed.
- 6492 Badly formed error label for Credentials Microsoft Azure.
- 6480 Spelling mistake retrieving remote path and error message shown.
- 6478 Sharing a template in collaboration, including software that does not use the cache of the fetch, raises an Internal Server Error.
- 6460 Imported appliances are counted as created on statistics in Dashboard.

3.7.fp1

Release Date: 2017-01-09

New Features

- Multi-NIC support for Linux based appliance templates.
- Driver injection improvements (internal mechanism) for Windows-based appliance templates.

Bug Fixes

- 6326 Impossible to publish an OpenStack VDI image
- 6323 Cloud account name appears twice in the public informations in UI for all Cloud formats
- 6234 Sticky package of imported template is not shown in the UI
- 6141 User gets a 500 call failed if a custom target platform has been added but not enabled specifically for the user
- 6042 OS packages are not sortable in the Repository column
- 6237 Spelling mistakes in the API docs
- 6222 Format enabling/disabling not working when updating the UI config
- 6453 Impossible to generate image when install profile contains users
- 6199 Migration fails because the user ID taken from a scan and user ID that the package makes overlap.
- 6409 OE-lite can't fetch QT source file
- 6206 Filter inactive pkgs on `DistributionPackages.getAll()` method
- 6200 Scanning a disabled OS is possible

- 6190 Scanning an azure vm with advance partitioning : install profile partitioning not correct
- 6180 Errors outputted into `/oar/oar_scan_job*.stderr` when scanning CentOS 6
- 6154 Launching windows scan binary from command line with API key does not launch the scan
- 6134 Pkg overlay archive are built differently if a black box migration is done first or if it's a scan import to appliance
- 6309 Several concurrent generations could fail if there are uncached software bundles files in it
- 6211 Creating a two bootscripts with same name does not show an error message
- 6194 Japanese Characters are OK to use but encoded incorrectly for Tag and Maintainer fields of a software component
- 6193 Same rpm file can be uploaded without overwritten to a software component
- 6178 Errors outputted into `/oar/job_finalize.log` when generating CentOS image
- 6169 Total Disk Usage doesn't count the size of files uploaded to software components
- 6027 Exported template has lost some information on MySoftware
- 6346 WARP should skip to inject uforge agent in the specific condition
- 6327 Scripts are not imported when sharing a template in a Workspace
- 6057 Yum update error `uforge_update.sh: line 660: [: too many arguments`
- 6055 The volume shadow copy is not deleted after scan of Windows.
- 6007 Code in `distrotools/lib/str.[c|h]` in function `repl_str()` cannot compile for windows using mingw c++
- 6440 Can't display Projects as guest user
- 6453 Impossible to generate image when install profile contains users

3.7

Release Date: 2016-12-27

New Features

None (released based 3.6-fp2)

Bug Fixes

- 6537 Removed AMI format for AWS S3
- 6521 Launching windows scan binary from command line with API key does not launch the scan
- 6517 Impossible to know which publish image on UForge corresponds to which Image in K5 portal
- 6515 CentOS 6 images can be accessed with SSH on K5
- 6513 Validation for K5 publish view is not properly handled
- 6511 Launching `uforge-scan.exe` from command prompt still fails if the file path includes Japanese characters

- 6507 The `uforge-install-config` binary for windows does not start because `uforge-install-profile-1-1.noarch.zip` does not contain the correct directory structure.
- 6505 The `no_console` file is not created for Windows.
- 6504 Problem with OpenDJ port 4444 usage in several UForge config scripts
- 6503 The `uforge.conf.ORIG` contains plain passwords with very weak permission
- 6502 AWS connector uses a fixed size 3.4 GB disk and publication fails for larger images
- 6422 Uploading an avatar image twice, the first image is still used
- 6410 Loading page empty during 5 seconds for the first time in `Software Library` view
- 5897 If a space is used in cloud accounts in openstack in the URL, then an internal error is observed
- 5849 Displaying the logo in view package details of a target format is not displayed
- 6488 Impossible to generate image when install profile contains users
- 6362 AWS resource connector no longer work due to credential changes
- 6064 The CLI command `org repo update` returns exception if `--type` param value is invalid.
- 5900 Generation sometimes fails if the second disk of the appliance is too small

3.6.fp2

Release Date: 2016-12-05

New Features

- Fujitsu K5 support. Can now register machine images generated on the platform to Fujitsu K5.

Note: The following operating systems are supported for the moment (others will be supported soon):

- CentOS 7.0
 - Ubuntu 14.04
-

- SELinux support when creating appliance templates and during migration
- Docker machine image generation support. This allows users to build docker base images.
- When scanning Windows machines, the scan report now includes the services detected.

Note: The platform does not support the comparison of windows-based scans at this time.

RFEs

- Better progress status when scanning Windows machines
- Less restrictive validation of website information in the MySoftware/Project Overview
- New icons for 'pull' and 'upload' for software/project files management

- Added directory icon when displaying all the files for software/project files view
- When deleting a folder, the confirm message should be more explicit (that all sub folders and files will also be deleted)
- Better explanation of the “cached” option for software/project files in the UI
- Managing licenses for software/project components; there is now an explicit delete button to remove an uploaded license file

Bug Fixes

- 6123 Publishing a generation from a scan results in 500 error in UI
- 6089 Member’s role on workspace couldn’t be changed if language is set as French or Japanese
- 6017 Canceling from Appliance Create no longer returns to previous page
- 5946 Publishing to CloudStack fails with the next error: vhd.gz: No such file or directory
- 5942 RHEL is added despite launching *org os add* for Oracle Linux or Scientific Linux with cli
- 5909 User ID and group ID of the install profile can be set 0
- 5906 UserResourcesAccessRights database mapping not proxied
- 5896 Deployment fails due to NIC settings
- 5892 Deployment fails when using eth1
- 5843 “org category delete” raises an error
- 5777 Launching uforge-scan.exe from command prompt fails with an error if the file path to the binary includes Japanese characters.
- 5762 Cannot register the third disk with a VirtualBox image
- 5756 New users, the default country is: Abkhasia
- 5754 opening the Dashboard > Generations page first shows progress bar for all publications
- 5752 Number of MySoftware components not properly refreshed in the UI
- 5750 Number of Appliance not properly refreshed in the UI
- 5748 The diskusage of “uforge user quota list” is displayed by byte
- 5684 Invite the same user in the collaboration members list does not show error message
- 5676 Duplicated variable in /etc/default/grub if distribution provides default values.
- 5647 Keyboard and kernel parameters are not taken into the scan report on CentOS 7 scan.
- 5635 Broken incremental scan for windows 2012R2
- 5627 Cancelling scan via ctrl+c is not correctly displayed in the UI
- 5625 uforge-scan does not respect bandwidth limit
- 5623 When the image of CentOS7 is generated, RPM-GPG-KEY-CentOS import read fails
- 5621 rpmgen fails to build package if file path in %file includes space.
- 5570 Impossible to delete an incremental scan
- 5562 UForge CLI accesses to interactive mode even if the user or password are wrong
- 5560 The input value of the activation key is not saved in a Windows appliance

- 5342 Scan incremental with Ubuntu does not appear in UI
- 5265 No dialog box displayed after running an instance on Azure

3.6.fp1

Release Date: 2016-10-31

New Features

- Import/Export of appliance templates in the user interface
- **Software (MySoftware) and Project bundles now consolidated. New features added including:**
 - pulling files from remote locations (HTTP, FTP endpoints) so the user no longer requires to upload software components to the platform
 - pulling files can be cached for future generations or pulled on each generation
 - file permissions added for files and directories
 - can create directory structures in a software bundle
 - can add tagging information to a software bundle
 - can add native packages from OS repositories to a software bundle
 - can add boot scripts to a software bundle
 - identify the software bundle only being supported on a subset of operating systems
- API keys can be used for authentication when running a scan for migration.
- Scan messages and error messages cleaned up and more understandable
- Japanese language localization for the UI

Bug Fixes

- 5293 Image generation error: Windows image must have at least 512 MB of memory
- 5729 Issues with migration from 3.5.1. to 3.6
- 5465 Build fails due to unreachable rpm-4.11.2.tar.bz2
- 5740 Fix DB schema checks
- 5331 AWS publish no longer works
- 5637 Windows generation from scan fails at boot
- 5427 Unable to generate a virtual machine with LVM inside a MSDOS disk
- 5291 All combo boxes are empty when a value has been selected
- 5876 Logo broken on Dashboard
- 5444 Unable to populate Fedora/RHEL distributions
- 5420 When a template is removed from a workspace, a DELETE error appears in the log file
- 5527 Subscription info does not list the frequency of quotas

- 5494 Scan fails because of files of type c (character device file)
- 5483 The service command not found in a machine generated by UForge
- 5442 The file deletion of Project fails
- 5429 Root can disable root account in UForge CLI
- 5746 Timeout of 10 seconds for the UForge CLI is not usable
- 5563 Internal error in Migration tab
- 5558 500 Call Fail Error when generating an image from scan
- 5556 The targetformat of Amazon is not displayed when generating an image
- 5553 If a scan is deleted, the image generated from the same scan is not deleted
- 5551 Spelling mistake in UI when publishing to Flexiant
- 5549 The error of Keystone version is displayed in Keystone Server URL
- 5403 Scan fails when trying to rebuild a non repo package

CHAPTER 13

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CHAPTER 14

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CHAPTER 15

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CHAPTER 16

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